USAID | COLOMBIA
FROM THE AMERICAN PEOPLE

AN ANALYSIS OF THE SUPPLY CHAIN OF
CACAO IN COLOMBIA

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…the willingness of multiple actors of the Colombian cacao sector to participate in interviews, focus groups, workshops, telephone interviews and follow-up calls. In addition to this, we received key insights from international cocoa traders, experts in fine flavor cacao and chocolate and a range of development actors. To a large extent, the current report reflects their wisdom, knowledge and concerns about the future of the sector and its potential role in post conflict rural development in Colombia. We gratefully acknowledge the financial and technical support received from USDA and USAID that made this report possible. Finally, any errors and omissions remain ours.

CONTENTS

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ABBREVIATIONS & ACRONYMS

ADAM	Áreas de Desarrollo Alternativo Municipal (Municipal Alternative Development Areas)
ANDI	Asociación de Industriales de Colombia (Association of Industries of Colombia)
ANI	Agencia Nacional de Infraestructura (National Infrastructure Agency)
BMC	Bolsa Mercantil de Colombia (Colombian Stock Exchange)
CfP	Cacao for Peace
CIAT	Centro Internacional de Agricultura Tropical (International Center for Tropical Agriculture)
COP	Colombian peso
CORPOICA	Corporación Colombiana de Investigación Agropecuaria (Colombian Corporation for Agricultural Research)
CPGA	Centro Provincial de Gestión Agropecuaria (Provincial Center of Agricultural Management)
DANE	Departamento Administrativo Nacional de Estadística (National Administrative Department of Statistics)
DNP	Departamento Nacional de Planeación (National Planning Department)
ELN	Ejército de Liberación Nacional (National Liberation Army)
EPSAGRO	Empresa Prestadora de Servicios de Asistencia Técnica (Companies Providing Loaned Technical Assistance Servicies)
FARC	Fuerzas Armadas Revolucionarias de Colombia (Revolutionary Armed Forces of Colombia)
FEDECACO	Federación Nacional de Cacaoteros (National Federation of Cacao Growers)
FINAGRO	El Fondo para el Financiamiento del Sector Agropecuario (The Fund for Financing the Agricultural Sector)
FOB	Freight on Board of Free on Board
GOC	Government of Colombia
ICCO	International Cocoa Organization
ICE	Intercontinental Exchange
ICR	Incentivo a la Capitalización Rural (Rural Capitalization Incentive)
INCODER	Instituto Colombiano de Desarrollo Rural (Colombian Institute for Rural Development)
KG	Kilogram
MADR	Ministerio de Agricultura y Desarrollo Rural (Ministry of Agriculture and Rural Development)
MIDAS	Más Inversión para el Desarrollo Alternativo Sostenible (More Investment for Alternative Sustainable Development)
MT	Metric Ton
SENA	Servicio Nacional de Aprendizaje (National Training Service)
UAF	Unidad Agrícola Familiar (Productive Family Unit)
UMATA	Unidad Municipal de Asistencia Técnica (Municipal Units of Technical Assistance)
UNODC	United Nations Office of Drugs and Crime
UPA	Unidad de Producción Agropecuaria (Unit of Agricultural Production)
UPRA	Unidad de Planificación Rural Agropecuaria (Planning Unit for Rural Agriculture)
USAID	United States Agency for International Development
USDA	United States Department of Agriculture

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GLOSSARY

Bulk cacao
The majority of the cacao produced and sold on the world market that does not meet a certified criteria. One of the two broad categories of cocoa beans the world cocoa market uses.

CCN-51
Colección Castro Naranjal (attempt number 51) is a disease resistant, high-yielding, and often controversial cacao vareity developed by Ecuadorian Homero Castro in the 1960s. It has gained a reputation of producing inferior tasting cacao and is seen as a threat to genetic diversity and fine-flavor designations. Many farmers, however, find it easier and more profitable to grow than other varieties.

Cacao criollo
Native to Central and South America and the Caribbean islands, only 5% of the world's cacao production is criollo. Criollo varieties are extremely vulnerable to a variety of environmental threats and have low yields than other varieties. Their taste is described as delicate yet complex, low in classic chocolate flavor, but rich in secondary notes.

Cacao fermentation

a) a well-fermented bean

b) an insufficiently fermented bean: A cacao bean with incomplete fermentation will have an interior cotyledon which is violet or red-violet, with a semi-compact structure. The husk is difficult to separate. See *pasilla*.

c) "pizarroso" bean: Cacao bean without fermentation. The interior of the bean is blackish grey and the structure is completely compacted.

Cacao forestero
Forestero is principally cultivated in Africa, Ecuador, and Brazil and represents 80% of the world's production of cacao. It is much more resistant and less susceptible to the diseases as criollo varieties. This type of cacao is used principally to impart a deep "chocolate" flavor, however it often has a bitter taste and that lacks secondary flavors. It is often mixed with superior cocoa.

Cacao trinitario
This hybrid resulted from a cross between forastero and criollo varieties and is characterized with high variability in shape, form, size, and behavior and predominates in Colombia. This subspecies is the hybrid that is being used in the selections of the materials that are being cloned and recommended by Fedecacao.

Casa elba
A drying and storage unit found above the home dwellings or other structure found on the property.

En baba
Refers to cacao beans that are sold wet and have not been fermented or dried.

Fine and flavor cacao
One of the two broad categories of cacao beans the world cocoa market uses. A combination of criteria is used to assess the quality, however flavor qualities (i.e. fruit, floral, herbal, caramel, nut, and wood notes) rather than in the other quality factors primarily distinguish it from bulk cacao. Typically, criollo and trinitario cocoa tree varieties produce these beans while forastero types produce beans typically sold as bulk. However, there are known exceptions to these generalizations.

Freight on board (FOB)
Price quoted for the cacao beans sold at the ports prior to being shipped to an international destination

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Moniliophthora roreri
Monilia, a fungal disease that can cause up to 90% loss in a cacao plantation if not controlled through chemical or physical means.

Pasilla
Refers to cacao beans which are flattened, thin and are difficult to separate when cut length wise and usually caused from poor fermentation.

Price premium
Premio, given for improved quality of bean or increased quantity

Theobroma cacao
Scientific name for cacao or cocoa which in Greek translates as "Food of the gods." It has been established that there is a strong relationship between the content of methylxanthines, theobromine and caffeine and the genetic material.

Witch's broom
Escoba de bruja, a disease found on the branches of cacao trees caused by *Moniliophythora perniciosa.*

EXECUTIVE SUMMARY

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Throughout this publication, there are many photos taken during the San Vicente de Chuchurí, Cacao Festival, August 13-15, 2016. It was only the second of its kind - the first festival took place over a decade earlier in July 2004.

Violence and lack of political will within the region precluded subsequent festivals. For many residents, the renewal of the festival was especially joyous and poignant; it represented a triumph of peace and a growing civic pride. A community once characterized as unsafe and instable, was now celebrating itself as the "Capital of Cacao Production in Colombia" and cacao as "the source of income for the future."

The main goal of the USAID/USDA project, Cacao for Peace (CfP), is "to strengthen Colombia's key agricultural institutions in the public and private sector for cacao with cooperative research, technical assistance, and extension education. The CfP vision is to improve rural well-being through agricultural development that is inclusive and sustainable with positive impact on cacao farmers' incomes, economic opportunities, stability and peace." Under this directive, USDA commissioned this report to examine the cacao supply chain in detail in select regions of the country, discuss opportunities and strengths with producers and key stakeholders, and offer strategic approaches to position Colombia's cacao sector in domestic and international markets with the end goal to realize the potential for cacao as an avenue for peace.

For the purposes of this study, a mixed methods approach was taken. It is focused on four research threads which examine (1) the physical cacao flows – from farm to processor to end user; (2) the prices received for cacao along the chain, including the costs related to procurement and processing; (3) the actors along the chain – including their roles, behaviors and recommendations for increasing efficiency in the Colombian cacao sector; and 4) the contextual issues and considerations that affect market outcomes in the Colombian cacao sector, including production and processing, and confectionery in general.

Colombia differs from larger exporting nations (Cote d'Ivoire, Ghana, Ecuador) in a number of ways. First, global multi-nationals play a more limited role, with two Colombian companies – Casa Luker and Nutresa – purchasing over 80% of Colombian cacao bean production. The smaller importance of international markets, extent of development and infrastructure in Colombia, and the presence of these two large buyers means the marketing structure within Colombia is different from that found in the major cacao exporting countries. Second, most traders in Colombia maintain at least informal relations with either one of the two large chocolate companies or with a small chocolate manufacturer. The majority of cacao produced in Colombia ends up going to one of these buyers. Significantly smaller volumes of cacao flow from the central traders to small chocolate manufactures, as well as to the international market. Third, producer prices in Colombia (prices paid at the Casa Luker and Nutresa buying centers) closely follow the ICCO world price and are well above prices paid to producers in the majority of cacao producing countries of the world. Finally, significant internal demand for cacao and chocolate products, such as drinking chocolate, exists in Colombia and constitutes an important market outlet for many cacao producers.

The Colombian cacao sector presents opportunities specifically in the context of post-conflict development. Recent efforts to promote the sector have focused on expanding cacao production and to a lesser degree post-harvest management, the establishment of producer organizations, and the exploration of niche markets. Despite these interventions, the sector still underperforms its potential. Rather than focus primarily on cacao production, we propose a strategy that clarifies roles and responsibilities in the sector to avoid inefficiencies and overlap and thereby enhance coordination and collaboration amongst national and regional actors, investments in strengthening producer organizations to become viable rural businesses, the provision of clear market signals and incentives for improved best management practices. After considering all of the stakeholder input and available data, we believe these interventions will improve the competitiveness and productivity of cacao production can help the cacao sector live up to its potential.

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INTRODUCTION

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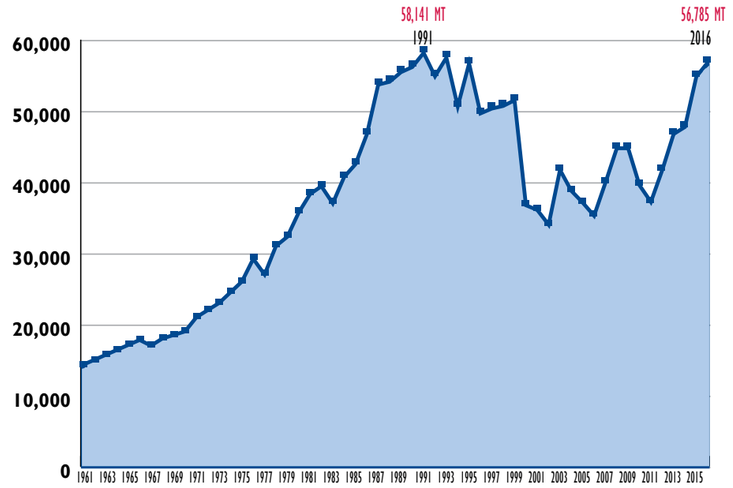
Cacao has been produced in Colombia for millennia, tracing its biological origins to the upper Orinoco region of north eastern Colombia (Motamayor et al., 2002), and has served as a culturally important part of the diet ever since. Currently, global cacao production is heavily concentrated in Africa (primarily Cote d'Ivoire, Ghana, Cameroon and Nigeria, comprising 63.2%), Asia (primarily Indonesia and Papua New Guinea, comprising 17.4%) and Latin America (primarily Ecuador, Brazil, Peru, Dominican Republic and Colombia, comprising 14.1%). However, unlike many other countries presently producing cacao, modern day Colombian cacao production is primarily focused on meeting domestic demand rooted deeply in the historical traditions of drinking chocolate.

Efforts made by Colombia over the past decade have led to expansion of cacao production (Figure 1). Colombian cacao production peaked in 1991 at just over 58,000 MT from approximately 125,000 ha of harvested acres (Figure 2). Since then, Colombian production has oscillated, likely based on a variety of market and non-market factors (prevailing prices, the internal conflict, perceived demand of the domestic market, weather, etc.).

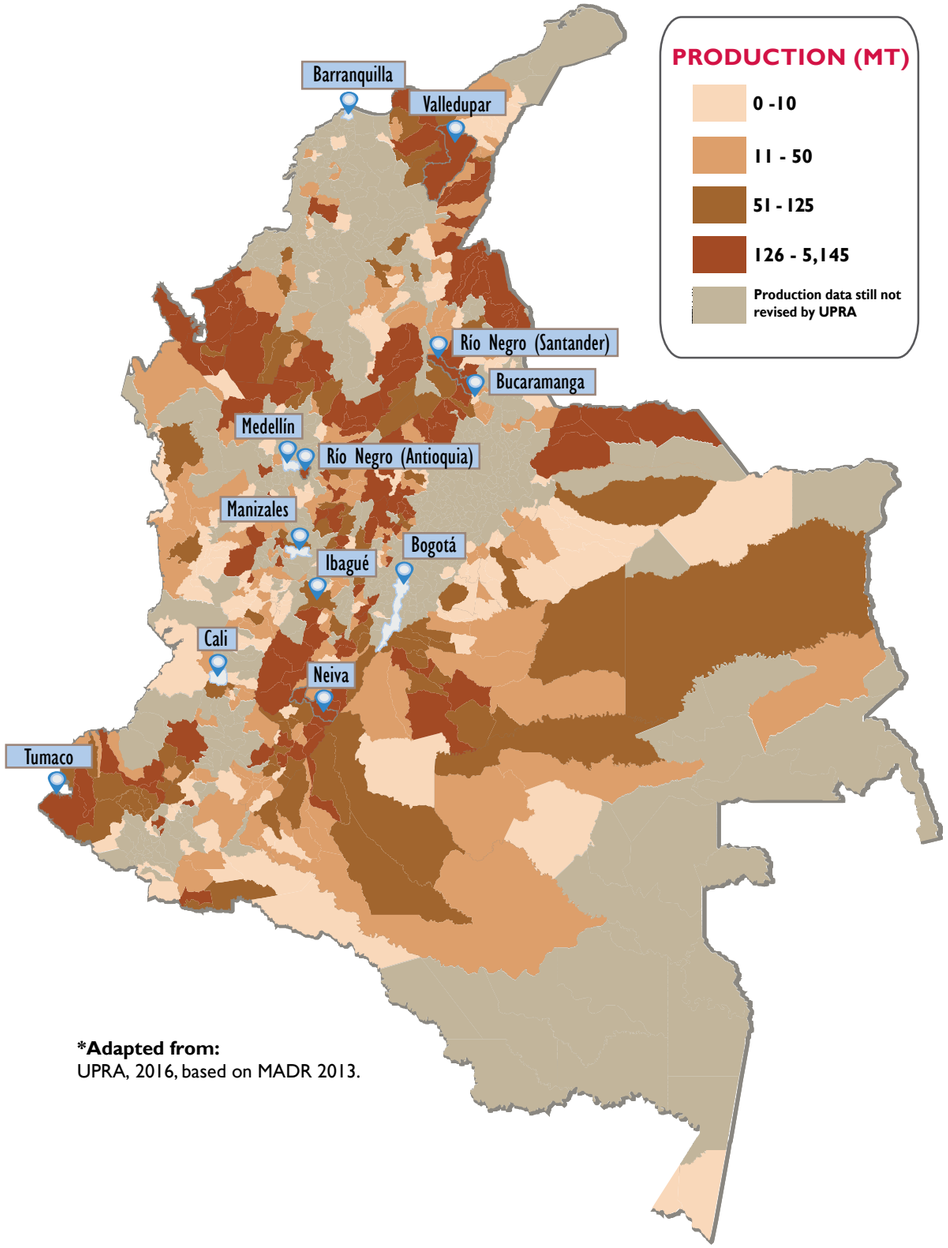
Cacao yield has stayed flat for the past 60 years, but annual production has increased through area expansion (Figure 3). The increase in harvested acres between 2012 and 2014 may be the result of development projects promoting cacao plantings between 2006 – 2011 (e.g. ADAM - Areas for Municipal-Level Alternative Development Program/Áreas de Desarrollo Alternativo Municipal and MIDAS - Additional Investment for Sustainable Alternative

FIGURE 2. ***COLOMBIAN CACAO PRODUCTION, (1961-2016)***
(in Metric Tons, MT)



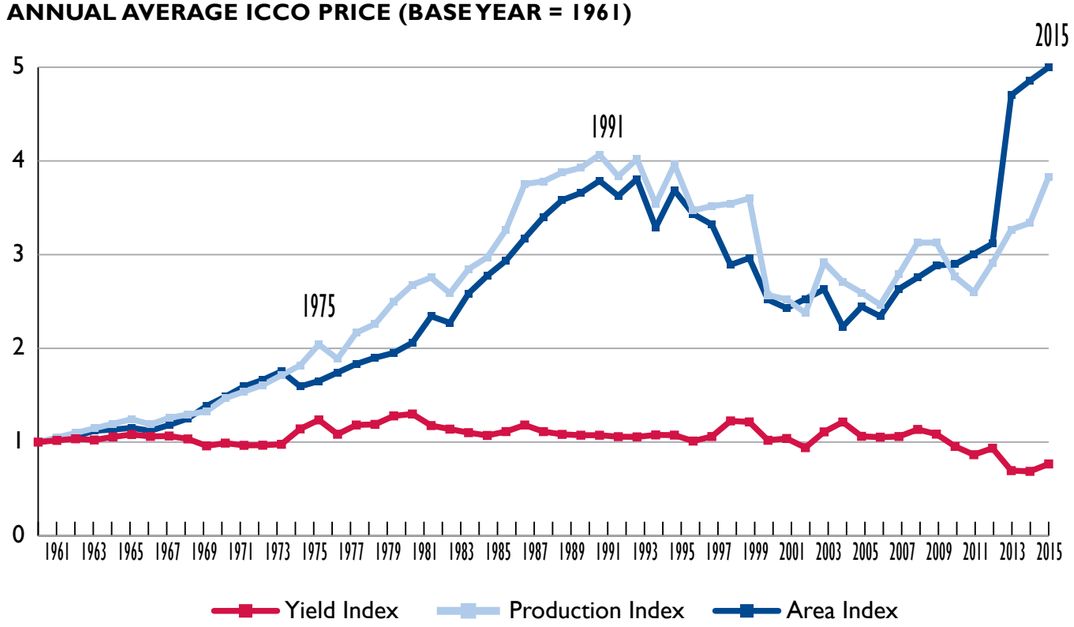
Source: FAOSTAT, 2017; Fedecacao, 2017.

FIGURE 1. ***CACAO PRODUCTION BY MUNICIPALITY, 2013***
(in Metric Tons, MT)



***Adapted from:**
UPRA, 2016, based on MADR 2013.

FIGURE 3. INDICES OF COLOMBIAN CACAO PRODUCTION, AREA HARVESTED, YIELD AND ANNUAL AVERAGE ICCO PRICE (BASE YEAR = 1961)



Source: FAOSTAT, 2017.

Development Program/Más Inversión para el Desarrollo Alternativo). These plantings have started coming into maturity and smallholders have been enticed to intensify the harvesting of their cacao (one of several crops that they typically have in their portfolio). As a result, since 2000, Colombia's total cacao production has grown from 36,731 MT to 56,785 MT in 2015 (FAOSTAT, 2016; Fedecacao, 2015).

Cacao beans are used across the globe in foods (chocolate and products containing chocolate and/or cacao butter, powder or paste) and cosmetics. While consumption varies from country to country, by in large, cacao consuming countries reside outside of the tropics. Conversely, all cacao producing countries can be found within the tropics due to the biological requirements of the tree. Generally speaking, there are three varieties of cacao, forastero (designated by some as 'bulk' on the global market), criollo and trinitario (varieties from which the 'fine and flavor' designation is derived).

Forastero is most commonly found in Africa, while criollo and trinitario are common in Latin America and Caribbean as well as a few countries in the Atlantic, Indian and Pacific Oceans. All varieties are used in chocolate manufacturing, with 'bulk' cacao used broadly and some 'fine and flavor' used in niche chocolate and 'bean to bar' operations (Dand, 2010; ICCO, 2017) The International Cocoa Organization (ICCO) currently (as of May 2016) recognizes twenty-three 'fine and flavor' origins and offers a rule-of-thumb estimate of the percentage of exports from those origins composed of 'fine and flavor' cacao (Table 1). The notion of 'fine and flavor' cacao is essentially defined by the ICCO as cacao from Latin American varieties. This being said, there is an extremely important distinction that cannot be overemphasized, **the current world market does not differentiate between the two designations.** Origin can matter, as is evidenced by origin differentials, but these accrue for a variety of reasons, including volume and overall quality.

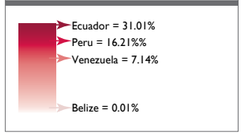
Quantities of fine and flavor cacao, misleadingly presented in "pyramid" representations of cacao market segments by consulting firms and aid agencies promoting this market segmentation (see Figure 9, pp. 27), are based on a political decision in an ICCO committee. These pyramids also associate large premiums (US$500-1000 per ton above the ICCO price) with upper levels of the pyramid that are not supported by any cacao transactions data on global markets. The distinction of 'fine and flavor' is an attempt to further differ-

TABLE 1. *GLOBAL CACAO BEAN PRODUCTION BY COUNTRY, 2014*

Rank	Country	Total Quantity Produced (MT)	Total Percent of World	Bulk	% of Bulk	Fine and Flavor	% of Fine and Flavor	ICCO
1	Cote d'Ivoire	1,434,077	32.2%	1,434,077	35.21%			-
2	Ghana	858,720	19.3%	858,720	21.09%			-
3	Indonesia	728,400	16.4%	721,116	17.71%	7,284	1.93%	1%
4	Brazil	273,793	6.2%	273,793	6.72%			-
5	Cameroon	269,902	6.1%	269,902	6.63%			-
6	Nigeria	248,000	5.6%	248,000	6.09%			-
7	Ecuador	156,216	3.5%	39,054	0.96%	117,162	31.01%	75%
8	Peru	81,651	1.8%	20,413	0.50%	61,238	16.21%	75%
9	Dominican Republic	69,633	1.6%	41,780	1.03%	27,853	7.37%	40%
10	Colombia	47,732	1.1%	2,387	0.06%	45,345	12.00%	95%
11	Papua New Guinea	45,019	1.0%	4,502	0.11%	40,517	10.72%	90%
12	Togo	30,516	0.69%	30,516	0.75%			-
13	Mexico	26,969	0.61%			26,969	7.14%	100%
14	Venezuela	21,735	0.49%			21,735	5.75%	100%
15	Uganda	20,979	0.47%	20,979	0.52%			-
16	Sierra Leone	15,879	0.36%	15,879	0.39%			-
17	India	15,000	0.34%	15,000	0.37%			-
18	Haiti	14,633	0.33%	14,633	0.36%			-
19	Guatemala	13,109	0.29%	6,555	0.16%	6,555	1.73%	50%
20	Guinea	9,439	0.21%	9,439	0.23%			-
21	Madagascar	8,818	0.20%			8,818	2.33%	100%
22	Liberia	7,500	0.17%	7,500	0.18%			-
23	Bolivia	7,164	0.16%			7,164	1.90%	100%
24	United Republic of Tanzania	5,645	0.13%	5,645	0.14%			-
25	Philippines	5,428	0.12%	5,428	0.13%			-
26	Congo	5,000	0.112%	5,000	0.12%			-
27	Solomon Islands	4,825	0.108%	4,825	0.12%			-
28	Sao Tome and Principe	3,200	0.07%	2,080	0.05%	1,120	0.30%	35%
29	Malaysia	2,665	0.06%	2,665	0.07%			-
30	Democratic Republic of the Congo	2,500	0.06%	2,500	0.06%			-
31	Cuba	2,188	0.05%	2,188	0.05%			-
32	Nicaragua	1,870	0.04%			1,870	0.49%	100%
33	Sri Lanka	1,812	0.04%	1,812	0.04%			-
34	Vanuatu	1,663	0.037%	1,663	0.04%			-
35	Jamaica	1,154	0.026%	58	0.00%	1,096	0.29%	95%
36	Honduras	941	0.021%	471	0.01%	471	0.12%	50%
37	Grenada	900	0.020%			900	0.24%	100%
38	Costa Rica	700	0.016%			700	0.19%	100%
39	Equatorial Guinea	668	0.015%	668	0.02%			-
40	Panama	641	0.014%	321	0.01%	321	0.08%	50%
41	Samoa	484	0.011%	484	0.01%			-
42	Guyana	469	0.011%	469	0.01%			-
43	Angola	414	0.009%	414	0.01%			-
44	El Salvador	366	0.008%	366	0.01%			-
45	Trinidad and Tobago	329	0.007%			329	0.09%	100%
46	Dominica	297	0.007%			297	0.08%	100%
47	Saint Vincent and the Grenadines	217	0.005%	217	0.01%			-
48	Gabon	207	0.005%	207	0.01%			-
49	Timor-Leste	163	0.004%	163				-
50	Thailand	144	0.003%	144				-
51	Central African Republic	133	0.003%	133	0.003%			-
52	Benin	117	0.003%	117	0.00%			-
53	Belize	75	0.002%	38	0.001%	38	0.01%	50%
54	Saint Lucia	63	0.001%			63	0.02%	100%
55	Comoros	42	0.001%	42	0.00%			-
56	Micronesia (Federated States of)	32	0.001%	32	0.001%			-
57	Fiji	20	0.000%	20	0.0005%			-
58	Suriname	6	0.000%	6	0.0001%			-
59	American Samoa	1	0.000%	1	0.00%			-
	Total	**4,450,263**	**100.0%**	**4,072,419**	**100%**	**377,844**	**100%**	
			% of World Production	**91.5%**		**8.5%**		

Fine and Flavor Origin Non-Fine and Flavor Origin

Fine and Flavor Origin
Percent contribution of total estimated world production of fine & flavor cacao.



Source: FAOSTAT, 2017; Authors' calculations based on percentages indicated by the ICCO; Comtrade, 2017.

"The price is negotiated between the traditional buyer and the provider. But when you have something that is considered special, you get people who are looking for the special, they look for it, and are willing to pay a little more for that depending on exactly how special it is. As ICCO's presentation suggested, it will range from a couple of hundred dollars per ton to potentially several thousands per extra ton. It depends again on how special it is. DIAMONDS ARE RARE."

- ED SEGUINE, president of the ICCO fine and flavor committee, discussed cacao quality and price premiums during the Cacao Revolution Conference (Vietnam, March 10, 2016.)

Department of Caldas: Cacao production in the "Eje Cafetero" the Cacao Axis, is growing.

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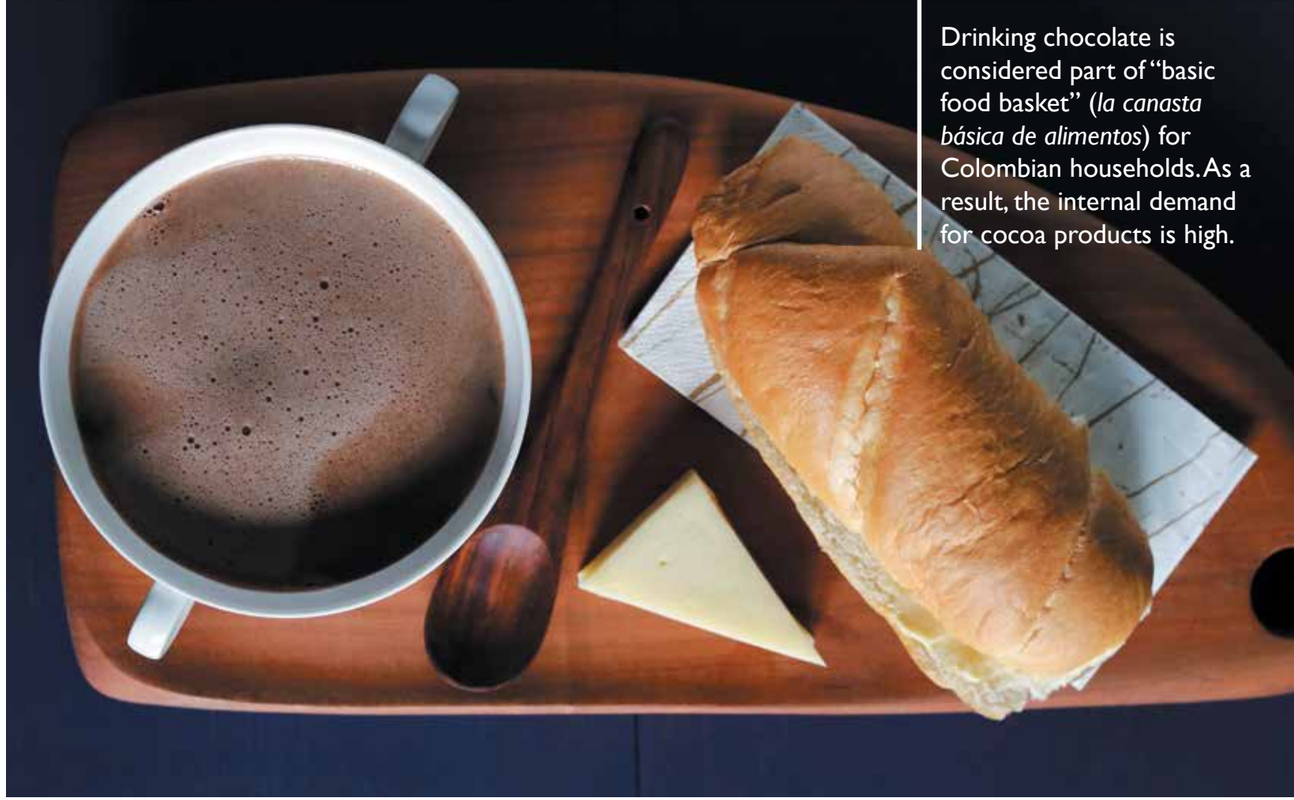
entiate the market, but the majority of the 'fine and flavor cacao' is either exported as bulk or used domestically. Evidence for this contradiction can be found in export data from the Ministry of Agriculture, Livestock, Aquaculture and Fisheries (MAGAP) in Ecuador, where the ICCO designated a 75% fine and flavor market share and most published estimates consider Ecuador the largest exporter of fine and flavor cacao. However, this is not supported by 2015 data which shows that CCN51 and ASE (*Arriba Superior Época*), neither of which is considered fine and flavor, constituted 72.6% of all Ecuadorian cacao exports between 2012 and September, 2015 (MAGAP, 2015, Personal communication). This finding is confirmed by Rios (2017) who also showed that not only did the market share not reflect that estimated by the ICCO (73.7% bulk between 2012-2016), but the weighted average of unit values for fine and flavor cacao was US$10 above the average ICCO price (US$2791 vs. US$2781/MT) during the same time period. Similarly, Rios (2017) reports a bulk market share in Peru of 56.2% (versus the ICCO estimate of 25% bulk) and Colombian export data reported by Rios (2017) suggests 77.5% of exports were bulk cacao between 2012-2016, nowhere near the 95% estimated by the ICCO. These findings suggest that the market share and associated premiums for fine and flavor cacao exports is drastically overstated in the pyramids mentioned above.

In the analysis that follows, we use the fine and flavor convention essentially as a thought experiment, since no publicly available data exists on actual 'fine and flavor' market transactions as an independent category. Instead, cacao trade data is reported annually and differences between unit values (prices) are simply averages over time potentially reflecting seasonal variation or overall quality. A recent study by Rios (2017) proposes a new definition for this market segment by combining data for unique cacao origins, organoleptically differentiated cacao and certified cacao into a 'special cacao' category but this has yet to be accepted by key market actors. It should be noted that the ICCO uses a combination of criteria, both qualitative and quantitative, to determine the 'fine and flavor' designation, but admits that measurement of some of the criteria is 'subjective' (ICCO, 2017).

Dand (1999, 2010) summarized the situation this way,

> *But as dark or plain chocolate makes up only a small proportion of total chocolate sales the relevance of the mainly trinitario beans (pure criollo has all but disappeared) has diminished. This is in line with its production; one estimate puts the amount of fine and flavor cocoa at below 5% of the world crop. In fact, it may be much lower as many traditional growers of trinitario cocoa also produce the forastero type, and the export figures, on which the estimate was made, do not distinguish between the two. The role of trinitario for special high quality chocolate is also under threat; one expert taster working for a large chocolate manufacturer admitted privately that very good dark chocolate, equal to the flavor of that made with fine and flavor cocoa, could be made from forastero beans.*



Drinking chocolate is considered part of "basic food basket" (*la canasta básica de alimentos*) for Colombian households. As a result, the internal demand for cocoa products is high.

Adobe Stock

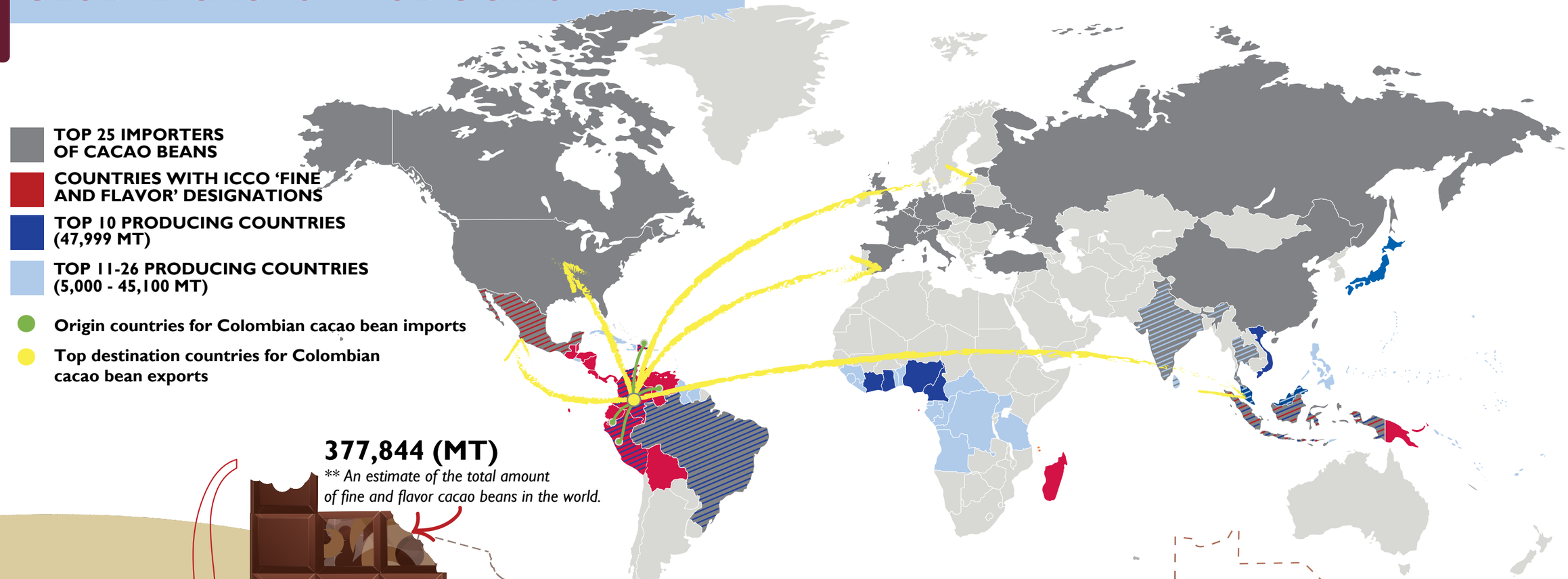
Dand's position, held for over a decade now, is supported by the current data, which summarizes the market share for premium and super-premium chocolate markets as being "extremely small relative to the other segments" (Puro, 2016). Actually, the ICCO estimates that 95% of cacao from Colombia is exported as 'fine and flavor'. Nevertheless, globally production, export, and import statistics do not differentiate between bulk and 'fine and flavor' cacao (Puro, 2016). For the purposes of this study, we use a combination of FAOSTAT production data (available through 2014) the current ICCO 'fine and flavor' export percentages and the list of top fine and flavor consuming countries to gauge the relative sizes of hypothetical bulk and 'fine and flavor' supplies and consumption (Figure 4).

Colombian households consume large amounts of *'chocolate de mesa'* or drinking chocolate as part of their basic diet. This product, which takes several forms, tends to contain relatively high concentrations of cacao solids as well as palm oil, sugar, and occasionally flavors such as cloves, cinnamon or vanilla. In addition to large companies such as Casa Luker and Nutresa (the holding company which owns Nacional de Chocolates), a number of smaller more regional chocolate firms exist. These smaller firms tend to focus nearly exclusively on chocolate de mesa and have much less space to maneuver when cacao prices rise.

As a part of the basic household food basket, consumers of table chocolate remain extremely price sensitive. In times of high cacao prices – such as those seen through mid-2016 – raw material cost growth outstripped the capacity of firms to pass along this cost, which contributed to shrinking margins in the drinking chocolate segment. Chocolate firms reacted in two distinct ways. Large and well capitalized firms such as Casa Luker and Nutresa invested in technology to increase processing efficiency and in product development for large range of value added products including powdered instant drink mixes based on cacao as well as expanded snack and bar offerings for the internal market. The resulting efficiency gains and additional income from value added products allowed them to

FIGURE 4

GLOBAL CACAO PRODUCTION



377,844 (MT)
*** An estimate of the total amount of fine and flavor cacao beans in the world.*

4,450,263 (MT)
**World production*

250,828 (MT)
*** Exportations of fine and flavor cacao beans*

21,600 (MT)
*** 'Fine and flavor' cacao used for "bean-to-bar"*

Estimation is between 9,000 - 45,000 (MT)
Approximately 300 Bean-to-bar businesses in the world process between 30-200 metric tons of cacao beans per year.

< 1% of World Production

"It is important that the name and reputation of Colombia grows, but we should NOT think that everyone is going to sell to the bean-to-bar market (limited and small)

- Emily Stone
Uncommon Cacao
August, 2016

Sources:
*ICCO
**Based on the authors' calculations using the FAOSTAT and Comtrade databases, the percentages of fine and flavor indicated by the ICCO, and interview data.
**** (Stone, E., 2016)

Cacao production in Colombia is nearly equal to the amount exported.

The ICCO daily price for cocoa beans is determined by calculating the average quotations of the nearest three active futures trading months on ICE Futures Europe (London) and ICE Futures US (New York) at the time of London close.

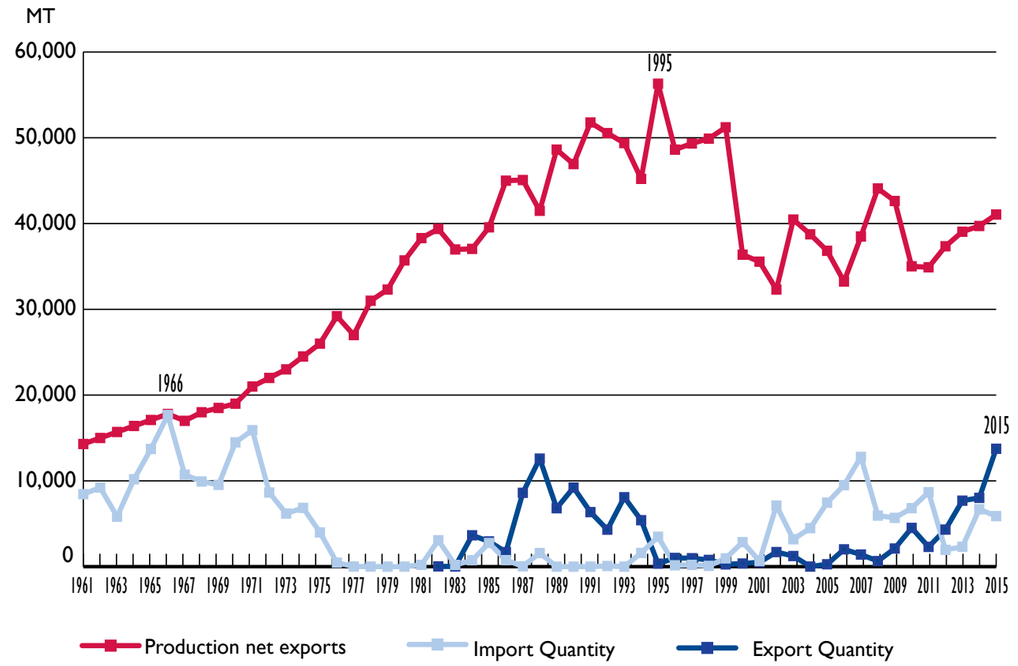
Colleen Kelly, Purdue

manage higher raw material costs with minimum disruption. Smaller regional chocolate firms, on the other hand, were at a disadvantage. These firms often pay more than large firms to access sufficient cacao and tend to manage a much smaller portfolio of traditional products focused on price-sensitive consumers. In interviews in Santander, the difficulties faced by these firms in terms of cash flow and access to raw material were clear. With the recent fall in global cacao prices, smaller firms should be in better financial shape but still face challenges to compete with large companies in terms of raw material prices, limited capacity to diversify into higher value products and difficult access to the formal financial system for capital investments to improve efficiency.

In light of stagnating international conditions for cacao, the Colombian domestic market constitutes an important safety valve in terms of demand. From a producer perspective, however, while this demand ensures a ready market, the income received is still subject to global market conditions given the relationship between domestic prices and cacao prices on the commodity exchanges in New York and London (an average of the two results in the standard international price, the ICCO price). Lower cacao prices clearly benefit the Colombian processing industry, both small and large firms, who are able to access lower cost raw materials for drinking chocolate and other cacao based products for both the domestic and export markets.

As mentioned previously, Colombia is an outlier in regards to other cacao producing countries in that significant internal demand exists. According to data from Baquero Lopez for 2015, total domestic consumption

FIGURE 5. COLOMBIAN CACAO PRODUCTS (NET OF EXPORTS), EXPORTS AND IMPORTS IN METRIC TONS (MT), 1961 - 2015



Source: FAOSTAT, 2017; Comtrade, 2017. Note: the production net exports plus exports equals total Colombian production (supply). In contrast, production net exports plus imports equals total Colombian consumption (demand).

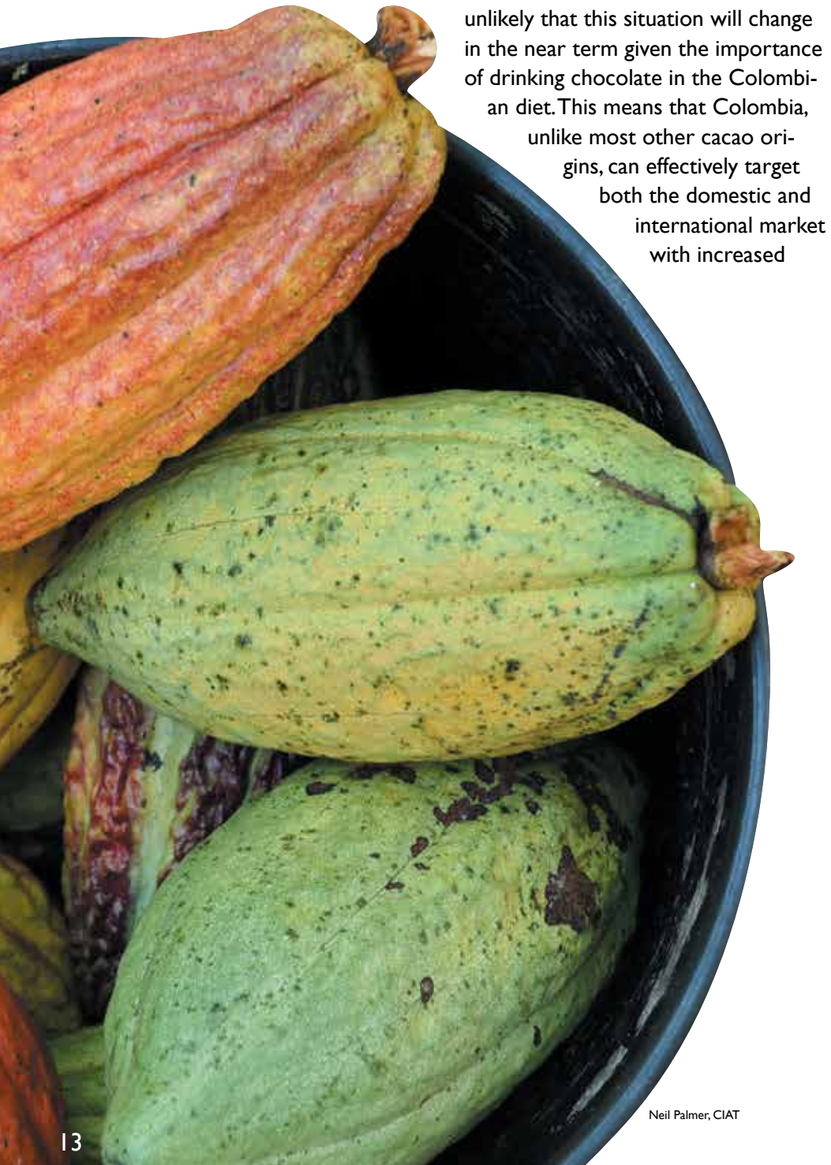
of cacao is slightly more than 47,000 MT. Exports accounted for slightly more than 24,000 MT in 2015, leading Colombia to import nearly 17,000 MT to meet domestic demand in that year (Baquero Lopez, 2016). This situation represents an improvement over previous years where Colombia imported cacao from neighboring countries despite registering little or no exports (Figure 5). The achievement of near parity between Colombian supply and demand comes from significant donor and government investment in the expansion of cacao area as an alternative crop to coca production and not from any improvement in historically low levels of productivity on most cacao farms. Between 2000-2015, the area harvested grew from 83,138 ha to 165,006 ha, nearly doubling (98.5% change). During the same period, production increased from 36,731 MT to 54,796 MT, a 49.2% increase. With harvested acreage far out-pacing production, calculated yields have decreased by 24.9% from 441.8 kg/ha to 332kg/ha. While there are a variety of agronomic factors at play each year, the basic lesson learned is that the intended effect of efforts to expand acres will be muted if productive capacity is not addressed concurrently.

In 2012, Colombia, again, became a net exporter (Table 2). In most situations, this is a result of excess supply or the only market available in producing countries. In the case of Colombia, given strong domestic demand, export markets are being sought for a percentage (10.4-25.1%) of total production as an alternative to the domestic market. However, the economic development situation can be best described as the value of the total amount exported less the value of the quantity of imports required by domestic firms to replace exported cacao. For example, from 2007-2015, Colombia generated nearly US$129 million in export revenue from cacao, but spent nearly US$147 million importing cacao. More recently, from 2012-2015, Colombia has generated nearly US$95 million in export revenue and spent US$46 million on imports, primarily from (in order of importance) Ecuador, Venezuela, Peru and the Dominican Republic. It is

TABLE 2. ***EXPORTS OF COLOMBIAN CACAO & IMPORTS***
2012 - 2015 (in Metric Tons, MT)

Year	Exports	Imports	Exports - Imports
2012	4321	1960	2361
2013	7693	2316	5377
2014	8018	6688	1330
2015	13744	5891	7853

Source: Comtrade, 2017.



Neil Palmer, CIAT

unlikely that this situation will change in the near term given the importance of drinking chocolate in the Colombian diet. This means that Colombia, unlike most other cacao origins, can effectively target both the domestic and international market with increased production volumes while prices will continue to track international market values.

A deeper examination into the destinations of Colombian exports reveals that, Colombia has exported cacao beans to thirty different countries since 2007 (Comtrade, 2017). From 2007-2011, Colombia exported 10,996 MT to sixteen destinations, generating US$34 million in export revenue. Primary partners during this time, in descending order of importance were Spain (25.7%), Germany (16.7%), Netherlands (14.7%), United States (14.7%) and Canada (9.3%), accounting for 80.8% percent of all exports. In contrast, between 2012-2015, Colombia exported 33,776 MT of cacao to 25 destinations, generating nearly US$95 million in export revenue. The top six destinations accounted for 80.7% of total exports and included Spain (24.7%), Mexico (23.9%), Malaysia (10.6%), Estonia (9%), Netherlands (7%) and the United States (5.5%).

From a regional demand perspective, destinations can be grouped to examine market share and unit values (Table 3). Between 2012-2015, more than half of Colombian cacao exports went to Europe (51.2%), accounting for 52.7% of export revenue, generated by Colombian cacao. North America (30.2%) was the second

TABLE 3. ***COLOMBIAN CACAO EXPORTS BY REGIONAL DESTINATION***
2012 - 2015 (in US$)

Region	Share of Exports	Share of Export Revenue	Unit Value ($/MT)
Asia	16.6%	16.1%	2728
Central & South America	1.6%	1.6%	2858
Europe	51.2%	52.7%	2892
North America	30.2%	29.2%	2711
World	33776 MT	$94,918,863	2810

Note: Between 2012-2015, Africa and Oceania accounted for only 100MT of exports so they are excluded.
Source: Comtrade, 2017.

most important destination and Asia (16.6%) was third. Central and South America were a distant fourth. Interestingly, the unit values for these transactions suggest that, on average, Colombian cacao has a higher value in Europe and Latin America, than in Asia and North America. A closer look at Asia, often highlighted as a premium cacao market, reveals that Malaysia is purchasing cacao at a lower unit value than Japan, but at much higher volumes.

Additional analysis of unit values, from 2012-2015, highlights one of the challenges facing Colombian cacao exports (Table 4). Based on a comparison with the ICCO price, Colombian cacao was sold, on average, at a unit value that ranged from -0.8% in 2014 to -3.1% in 2015 lower. Colombian cacao did sell, on average, above the ICCO price in 2012 (2.4%). With a domestic market that is competing to keep Colombian cacao in the country for domestic use, resulting in buying center prices that are approximately 90% of the ICCO price, and considering the transactions and search costs associated with identifying, developing and supplying export markets, entrants are having to make decisions based on their expected return on investment and their ability to foster the business relationships (not to mention the quality and volumes necessary to attract interest). These lower unit values, calculated using trade data reported by the Colombian government were corroborated by interviews with exporters and calls into question the prevalence of premiums accruing to Colombian cacao that was claimed by some stakeholders that we interviewed.

As stated earlier, currently, the ICCO estimates that 95% of Colombia's cacao exports are 'fine and flavor'. However, globally, statistics on pro-

TABLE 4. ***UNIT VALUES FOR COLOMBIAN CACAO EXPORTS IN COMPARISON WITH ANNUAL AVERAGE ICCO PRICES***
2012 - 2015 (in US$/MT)

Item	2012	2013	2014	2015
Colombia*	2,433.66	2,380.25	3,037.26	3,036.88
ICCO	2,377.07	2,439.09	3,062.76	3,135.17
Differential	56.59	-58.84	-25.50	-98.28

*It represents the total exports of Colombia to the world, without differentiating the country of destination.
Source: Comtrade, 2017.

TABLE 5. ***COLOMBIAN CACAO EXPORTS COMPARING TOTAL EXPORTS TO 'FINE AND FLAVOR' (FAF) DESTINATIONS, 2012 - 2015***
(in Metric Tons, MT)

Item	2012 Quantity (MT)	2012 Unit Value (US$/MT)	2013 Quantity (MT)	2013 Unit Value (US$/MT)	2014 Quantity (MT)	2014 Unit Value (US$/MT)	2015 Quantity (MT)	2015 Unit Value (US$/MT)
Partner: World*	4,320.86	2,433.66	7,692.69	2380.25	8,017.97	3,037.26	13,744.42	3,036.88
Partner:	1,090.94		1,678.56		813.64		2,030.16	
% of Quantity of FaF	25.2%		21.2%		10.1%		14.8%	
ICCO Average Price		2,377.07		2,439.09		3,062.76		3,135.17
Faf Weighted Average		2,875.14		2,433.69		3,123.34		3,184.43
FaF Premium, World		441.48		53.44		86.08		147.55
Faf Premium, ICCO		498.07		- 5.40		60.58		49.26

Source: Comtrade, 2017.

*World represents Colombia's overall cacao exports with the world, without differentiating by country. Note: 'Fine and Flavor' destinations, identified by the ICCO are Belgium, France, Germany, Italy, Japan, Switzerland, United Kingdom and United States.

duction, exports and imports do not differentiate between bulk and 'fine and flavor' cacao. This practice generally conforms to how the export markets operate. Even in 'fine and flavor' designated countries, cacao is typically blended to meet international standards based on bean size, fermentation, defects, etc. To look into the destinations a bit further, it is of interest to examine the top 'fine and flavor' destinations as determined by the ICCO (Table 5). Between 2012-2015, 23.7% of all Colombian cacao exports went to major 'fine and flavor' destinations. However, this percentage has dropped from a high of 25.2% in 2012 to 14.8% in 2015. In terms of prices (unit values), exports focused on 'fine and flavor' destinations had a high and similar 'premium' (over US$400) in 2012 in terms of the unit value of exports compared to all cacao exported from Colombia and the ICCO price. This 'premium' has not been stable even during years where the global price has been similar (2012 and 2013 or 2014 and 2015). If there is a premium for 'fine and flavor' demand from Colombia, it is much less than the estimates of others and is only applicable to a relatively small proportion of Colombian cacao exports.

While Colombia's attachment to cacao is longstanding, one cannot examine the current status of the industry without recognizing the impact that the past fifty years of civil strife has wrought on the country and the industry. The Colombian conflict has affected many of the potential cacao producing regions of the country: Arauca, Nariño (Tumaco area), Caquetá, Putumayo, Norte de Santander, Cauca (Coastal region), Valle de Cauca (Buenaventura area), Chocó (Atrato Medio y Bajo), northern Antioquia and Montes de Maria (Atlantic Coast) to name a few. In 2015, these affected areas represented approximately 38% of area planted to cacao and 32% of total cacao production (Fedecacao, 2015 and author's calculations). Consequently, small-holder farmers in conflict zones have received sporadic assistance and marketing channels have been challenged by limited access. With the advent of peace, opportunities for transforming Colombia cacao sector abound. However, many challenges remain and considerable investment is needed in order to elevate the importance of the cacao sector to Colombia's vitality through its contribution to rural Colombian incomes and gross domestic product. Case in point, in 2013, the gross production value of Colombian cacao beans was approximately US$103.5 million while the gross production value of the Colombian agriculture sector was US$22.1 billion or 5.8% of gross domestic product (FAOSTAT, 2016). Cacao may have a place in rural development with peace, but it is currently a very small part of the Colombian economy and its agricultural sector.

Neil Palmer, CIAT

Cacao is produced in almost every department in Colombia.

METHODOLOGY

The main goal of the USAID/ USDA project, Cacao for Peace (CfP), is "to strengthen Colombia's key agricultural institutions in the public and private sector for cacao with cooperative research, technical assistance, and extension education. The CfP vision is to improve rural well-being through agricultural development that is inclusive and sustainable with positive impact on cacao farmers' incomes, economic opportunities, stability and peace." Under guidance from USDA, this report was commissioned to examine the cacao supply chain in detail in a number of different regions in the country.

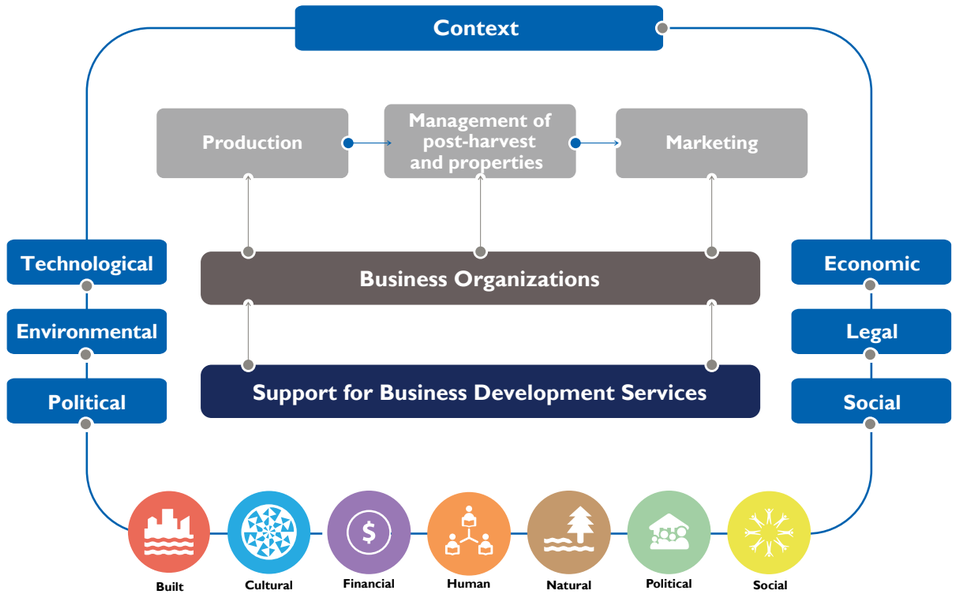
In this report, we will discuss the reasons we believe Colombia has struggled to keep production up to meet local demand, through an in-depth analysis of the cacao supply chain and offer some possible ways forward to utilize the many assets that could be capitalized on to help cacao become an avenue for peace.

For the purposes of this study, a mixed methods approach has been taken. It is focused on essentially four research threads which examine (1) the physical cacao flows – from farm to processor to end user – (2) the prices received for cacao along the chain, including the costs related to procurement and processing, and (3) the actors along the chain – including their roles, behaviors and recommendations for increasing efficiency in the Colombian cacao sector, 4) examine the contextual issues and considerations that affect market outcomes in the Colombian cacao sector, including production and processing and confectionery in general. In order to provide the baseline analysis needed to guide the implementation of Cacao for Peace's goals of leveraging the potential of this sector to achieve sustainable and inclusive peaceful development, CIAT (International Center for Tropical Agriculture) and Purdue utilized a holistic supply chain framework (Figure 6) to guide the research (Lundy et al., 2007; Lundy et al., 2014). The community capitals model guided the stake-holder input in the October meeting and the development of the recommendations.

In preparation for interacting with stakeholders, the working group from Purdue University and CIAT collected and analyzed more than 160 studies, assessments, and articles. The team sought out articles to understand business and producer organization models, examples of support services (extension, rural credit, market information), and analyses of the contextual issues (policy, economic, social, technology, environment) in which the cacao supply chain operates. This literature review led to the creation of ten interview instruments used during stakeholder interviews that took place between June and August, 2016.

This study focused on some specific geographies selected in consultation with the USDA and USAID missions at the US Embassy in Bogota for the stakeholder interviews. These included Santander, areas around the Sierra Nevada de Santa Marta, the Departments of Bolívar, Caldas, Cauca, Caquetá, Cesar, Guaviare, Huila, Nariño, Valle del Cauca, and the central part of the country. The team conducted more than 110 interview sessions across the cacao supply chain. We interviewed many types of cacao farmers (in terms of yields, size, and income), as well as whether they were associated or not-associated with local cacao producer organizations. We spent time meeting with governmental organizations such as the Ministry of Agriculture and Rural Development, Corpoica, local municipal government representatives, such as the San Vicente de Chucurí mayor's office, Santander Secretary of Agriculture, and municipal extension units (UMATAs). A number of interviews were conducted with members of Fedecacao (the national association for cacao producers), including the president, technical advisors, people at purchasing points, demonstration farm managers, and field technicians. Included in the interviews were non-governmental organizations and international donor organizations. We also conducted interviews with farmer associations and cacao buyers and aggregators. We took time to understand the supply chain from the local traders all the

FIGURE 6. ***INTEGRAL MODEL OF THE PRODUCTION CHAIN WITH COMMUNITY CAPITALS***



Community Capitals

The Community Capitals model, an asset based approach, provided the framework for the October workshop. Participants collaboratively constructed a vision of what "Cacao for Peace" meant to them and how the cacao sector could be leveraged to produce inclusive, sustainable development. The authors used participants feedback to inform the construction of the recommendations found in this report.

Participants in the two-day cacao supply chain analysis workshop, Oct. 26-27, 2016, Bogotá

(Right) A manager in charge of the Nacional de Chocolates Bucaramanga warehouse explains the process of receiving a shipment of cacao beans to the team.

(Below) One of the owners of Montebello Chocolate de Mesa, a small, family owned business in San Vicente de Chuchurí, demonstrates the mill she uses to grind cacao beans. The entrepreneurs process the cacao grown on their farms with sugar and spices in small batches at home. While they received food-safety and business training from SENA, the limitations and costs of machinery constrain their attempt to gain extra income through producing a value-added cacao product.

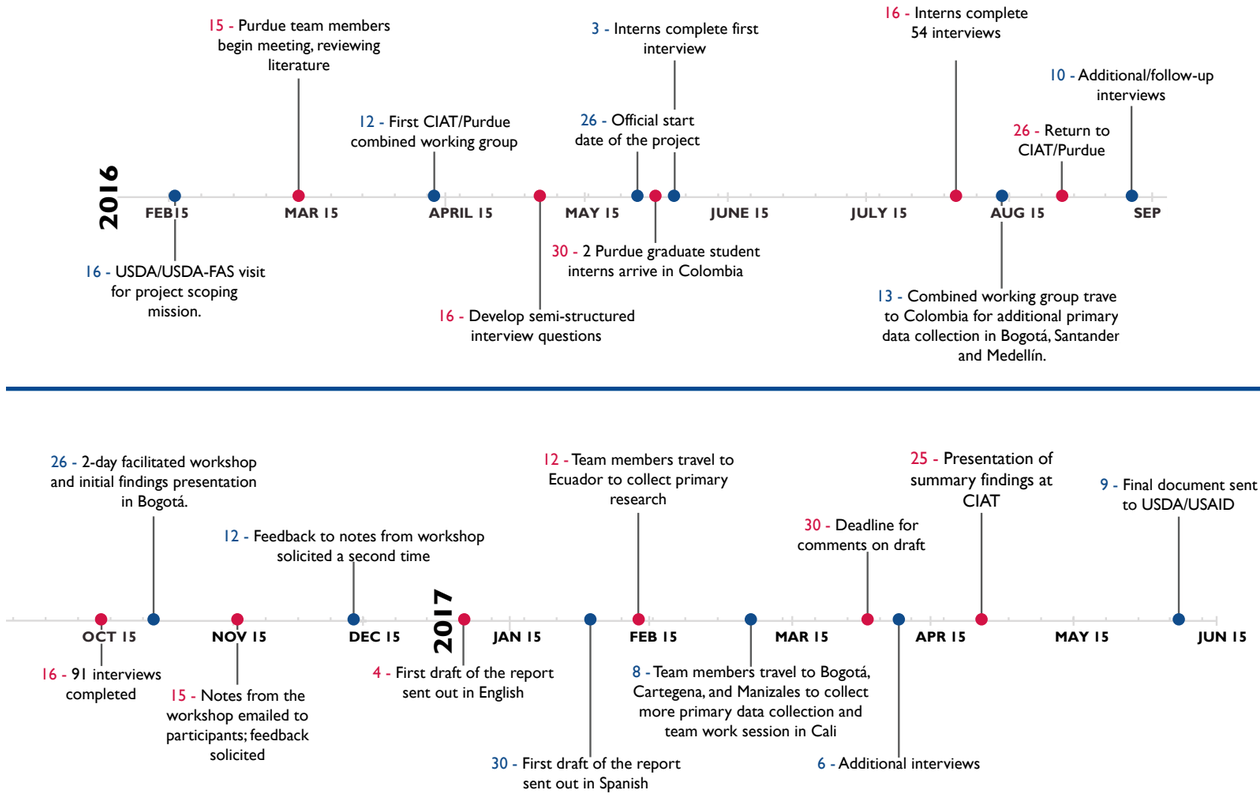
Colleen Kelly, Purdue

Colleen Kelly, Purdue

way through to large international corporations such as the Colombia-based Casa Luker and Nutresa as well as ECOM, an international commodities trader. We also interviewed a number of small and medium sized chocolate manufacturers.

The semi-structured interviews consisted of questions pertaining to the description of the individual, firm or organization, their role in the cacao supply chain, provision of extension services, sales of cacao, price structures, post-harvest practices, infrastructure, market opportunities, cacao and chocolate business models among other topics. We spent most of our time conducting field interviews in the previously mentioned geographical areas as well as interviews with domestic and international organizations in Bogota. No quantitative analysis was conducted on the data collected during the interviews because the methodology used was not set up as a countrywide survey where

FIGURE 7. *PROJECT TIMELINE*
(February 2016 - June 2017)



these sorts of results could have been extrapolated, rather the team triangulated results between sources to gain a better understanding of the sector dynamics, trends and underlying drivers. A nationally representative random sample of traders would better reveal cacao buying and pricing strategies throughout the country.

The stakeholder interviews were complemented by a workshop with forty stakeholders from the Colombian cacao sector. In addition to serving as a forum to review and complement preliminary findings from the study, the goals of the workshop included:

- Determine ways to foster prosperity and peace through a thriving cacao sector
- Build relationships among players in the cacao sector
- Understand the issues, needs and opportunities within the cacao sector
- Initiate the development of a collective vision for a thriving Colombian cacao sector
- Inform potential international partners interested in helping to address needs

As can be seen in Figure 7, a visual timeline provides an explanation of how we collected information and when. It also should be highlighted that we talked to people multiple times to get clarification and we triangulated information as much as possible. Additionally, during this first year, virtual discussion meetings were held between the authors, an average of 3 to 4 times a month, as the data were collected. It is important to point out that this is a complex system and no one has complete information. Our task was to provide a coherent package based on the available information, which was science, data, and stakeholder driven.

HOW CACAO MARKETS WORK – COLOMBIA VERSUS ELSEWHERE

Colleen Kelly, Purdue

Many studies of cacao supply chains across the globe bring attention to what they refer to as "long supply chains" (Cappelle, 2008) The amount paid to a farmer for the chocolate he or she produces is seen as quite small relative to the high prices that can be paid for premium chocolate bars in developed country markets. They allege that multi-national traders and chocolate manufactures exercise market power, resulting in low farmgate prices. Those firms counter by arguing that transportation and transactions cost, as well as processing and manufacturing costs, are substantial and easily account for the margins between prices that are observed along the supply chain. In the major exporting countries, cacao farmers can be quite remote and substantial effort is involved in evacuating large volumes of cacao from the countryside to ports, and several levels of traders are encountered along the chain. Those traders might also exercise market power, as well as governments who tax cacao exports. Work in West Africa was consistent with the arguments of the multi-nationals, and using new industrial organization methods, no evidence of market power exercised by multi-nationals was found (Wilcox & Abbott, 2006; Abbott, 2013; Homann, 2016).

The situation in Colombia is somewhat different from the cases of larger exporters (Cote d'Ivoire, Ghana, Ecuador). The global multi-nationals play a much more limited role, with only ECOM and OLAM showing a significant presence in Colombia. Two Colombian companies – Casa Luker and Nutresa – buy over 80% of Colombian cacao bean production (TechnoServe, 2015). They also process beans into intermediate products; supply a large domestic demand (relative to supply); export beans, butter, powder, paste and chocolate; and own buying, processing, production and distribution facilities in other Latin American countries. The smaller importance of international markets, extent of development and infrastructure in Colombia, and the presence of these two large buyers means the marketing structure within Colombia is different from that found in the major cacao exporting countries.

Much can be learned about the cacao bean buying process by looking at price data at various points along the supply chain. But that data needs to be interpreted with an understanding of how the supply chain is organized and how marketing functions in a country. While attention in much of the writing about cacao markets, and in policy discussions, focuses on farmgate prices, the producer prices that are published are ones obtained at well-organized points in markets, generally

Fernando Rodriguez Camayo, CIAT

Negotiating the sale of cacao in Sierra Nevada de Santa Marta

corresponding with some wholesale price. That is necessary to ensure consistent, comparable information. It is also necessary because farmgate prices will vary, being substantially lower for remote farmers located far from those organized markets. Significant transportation costs may need to be incurred, and those costs vary depending on how remote the farmer is. Our findings regarding prices draw on published price data as well as interviews conducted with key actors during the field component of this project.

Colombia is different from the major exporters in another respect that is crucially related to how the marketing system operates. In the latter countries, itinerant traders, who may or may not be formally related to large scale central traders, travel to remote farms to buy cacao directly from farmers. This aspect of the supply chain is one most likely subject to abuse, because those remote farmers likely have poor information on current cacao prices. In the areas we visited in Colombia, which included the Santander region, one of the major producing departments, we did not encounter such itinerant traders. Rather farmers transport their cacao themselves to large central traders. For example, we visited the cacao market in San Vicente de Chucuri, where such traders are clustered, and observed farmers bringing cacao to these traders. On the one hand,

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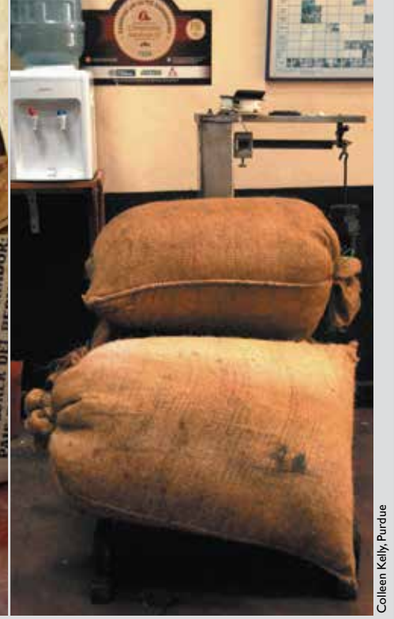

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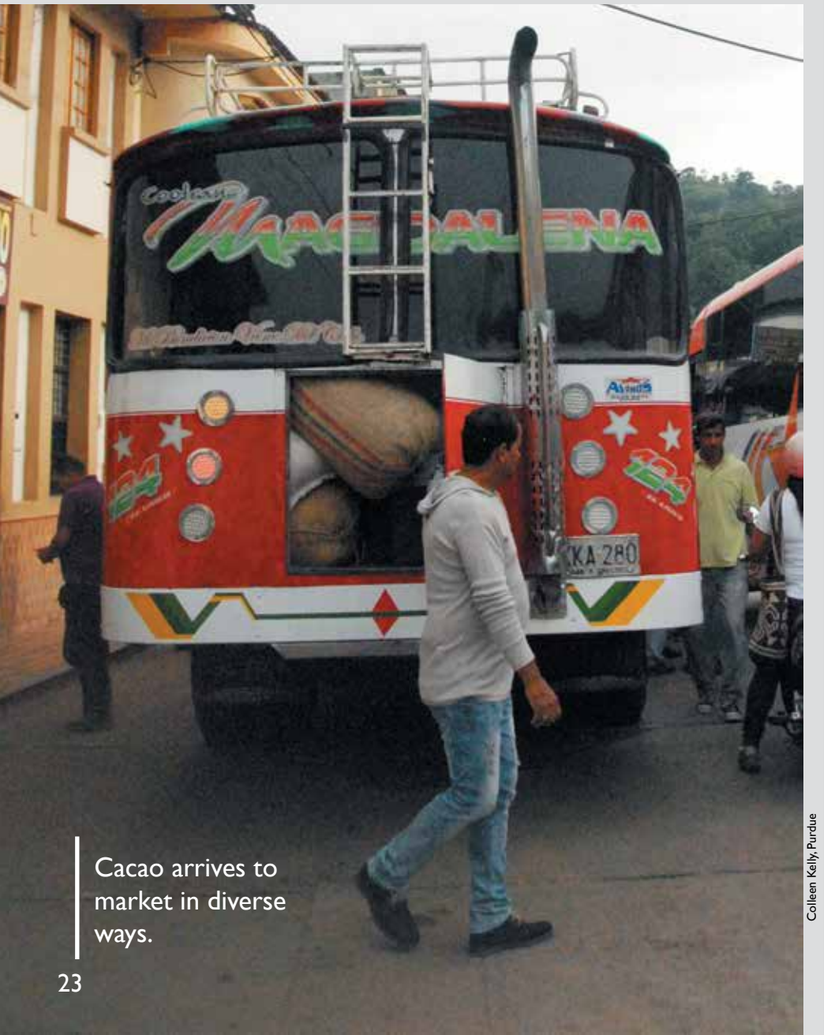

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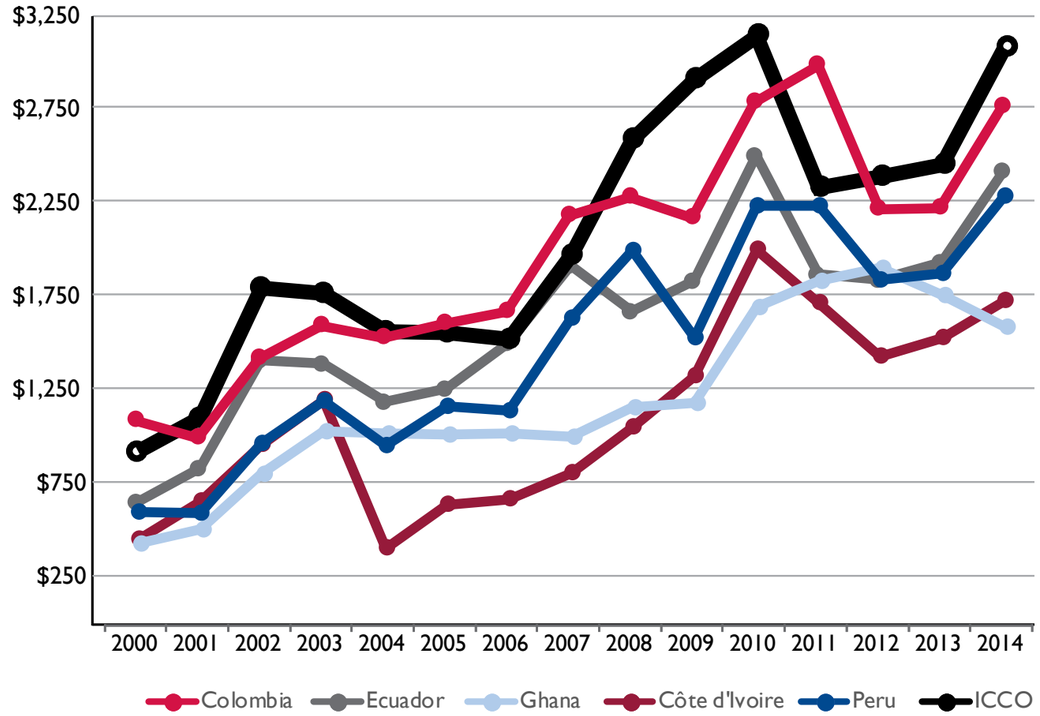
Cacao arrives to market in diverse ways.

farmers must utilize a wide variety of means to transport cacao (motorcycles, buses, mules, taxis, trucks, boats, etc.). On the other hand, upon arriving in town where the central market is located, farmers can readily determine the current cacao price.

Itinerant traders may well exist in new and remote cacao producing regions of Colombia, but they are not a significant part of the established marketing channels for the vast majority of Colombian cacao, at least right now. Farmers will generally only make the journey to market when they have a sufficiently large amount to sell, or when they have other reasons to travel. For those cases where transportation is challenging or from more remote areas in the country, buyers may collect cacao and bring it to larger buying centers.

Most of the central traders we encountered had at least informal relations with either one of the two large chocolate companies or with a small chocolate manufacturer, though they could be independent and can change those allegiances. Those associated with Casa Luker or Nutresa would ship their cacao to one of the buying stations operated by those firms, typically on large trucks owned by an independent shipper. Buying stations are located in Bucaramanga, Medellin, Manizales, and Bogotá. The majority of cacao produced in Colombia ends up going to one of these buying centers. There are also much smaller flows of cacao going from the central traders to small chocolate manufactures, and even to the port for export. In this case, and unlike the West African cases, the cacao processing/chocolate manufacturing firms are going somewhat "up-country" to acquire cacao, but still remain far from the farmgate.

FIGURE 8. ***ANNUAL AVERAGE CACAO PRODUCER PRICES (AT PURCHASING CENTERS)***
in US$/MT for select countries, 2000 - 2014



Source: FAOSTAT, 2017 and author's calculations based on news reports in Factiva Database.

Colombian producer prices, reported by Fedecacao and found in the FAOSTAT database, are the prices paid at the buying stations maintained by Casa Luker and Nutresa (Figure 8). Determination of farmgate prices requires information on transportation and transactions costs. In regions where cacao is abundant, there are many central buyers, and marketing infrastructure is well developed, so those costs will be low. In more remote regions and in departments where cacao is less prevalent and/or new, infrastructure will be less well developed, and there may even be relatively few central traders to handle movement of cacao to buying stations. In those cases, transactions costs will be higher, and in some cases traders may exploit a degree of market power. It is difficult analytically to disentangle market power from high transactions costs, as the remote locations potentially subject to exploitation are also those where realistically high transactions costs are very likely.

The standard global price for cacao is the ICCO price, shown in Figure 9. One can see that recent prices, including those applicable for August 2016, were at nearly all-time highs relative to the longer-term history of cacao prices. This was driven by surging demand, especially in Asia, and shortages in West African cacao production. When global demand for cacao was growing at 5-6% per year from 2009 to 2013, the ICCO price averaged US$2500/MT. In recent years, weak global macroeconomic performance may have limited demand expansion, but supply issues in West Africa led to higher international prices – peaking at over US$3100/MT. Demand trends may have slowed, but high prices are largely due to those perceived supply constraints rather than the demand trend.

Commodity markets (and especially cacao) generally exhibit significant volatility, and long run prices are difficult to predict. But simplistically assuming high prices are here for the foreseeable future, and can only increase, does not form a good basis for business planning. The past six

months has shown that to be the case, as cacao prices have plummeted below US$2000/MT in February 2017. The expected longer run cacao price may well be in the US$2500-3000/MT range, but assuming it will be much higher in the future would expose an investor to significant financial risk. Projects to expand cacao production should not presume excessively high prices when assessing economic viability. Several of the cost-benefit analyses of cacao expansion proposals we saw, in Colombia and elsewhere, are based on unrealistic assumptions on future prices.

There has been an effort by Latin American interests to promote a regional branding strategy based on the trinitario and criollo varieties that differentiate Latin American 'fine and flavor' cacao, from cacao from other regions in the world.

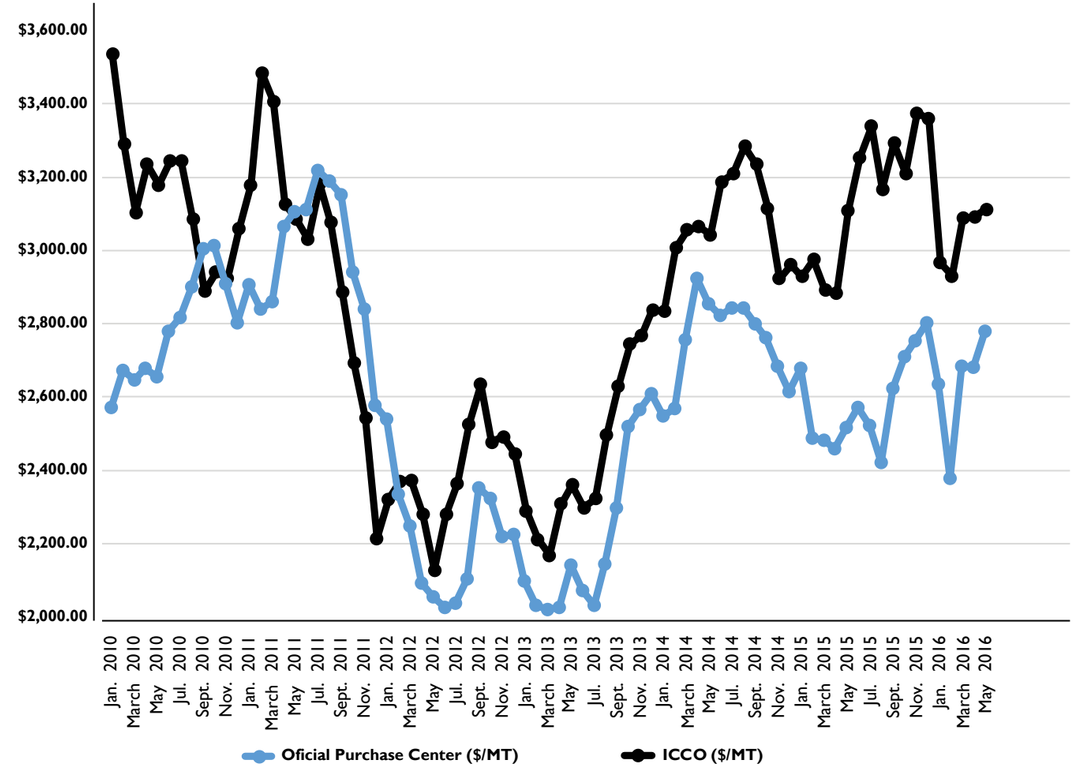
Many companies, institutions, and farmers believe that large premiums can be gained for 'fine and flavor' cacao that can be produced from varieties that thrive in Colombia. We have received numerous unverifiable claims on the magnitude of such premiums many of which cite presentations made by a small number of promoters of 'fine and flavor' (Homann & Frank, 2016). The ICCO suggests the premium is small. There are no published premiums to 'fine and flavor' cacao

Neil Palmer, CIAT

Colleen Kelly, Purdue

Buying centers often mix cacao beans from multiple producers.

FIGURE 9. ***MONTHLY COLOMBIAN CACAO PRICES PAID AT OFFICIAL PURCHASE CENTERS AND BY ICCO***
(in US$/MT, January 2010 - May 2016)



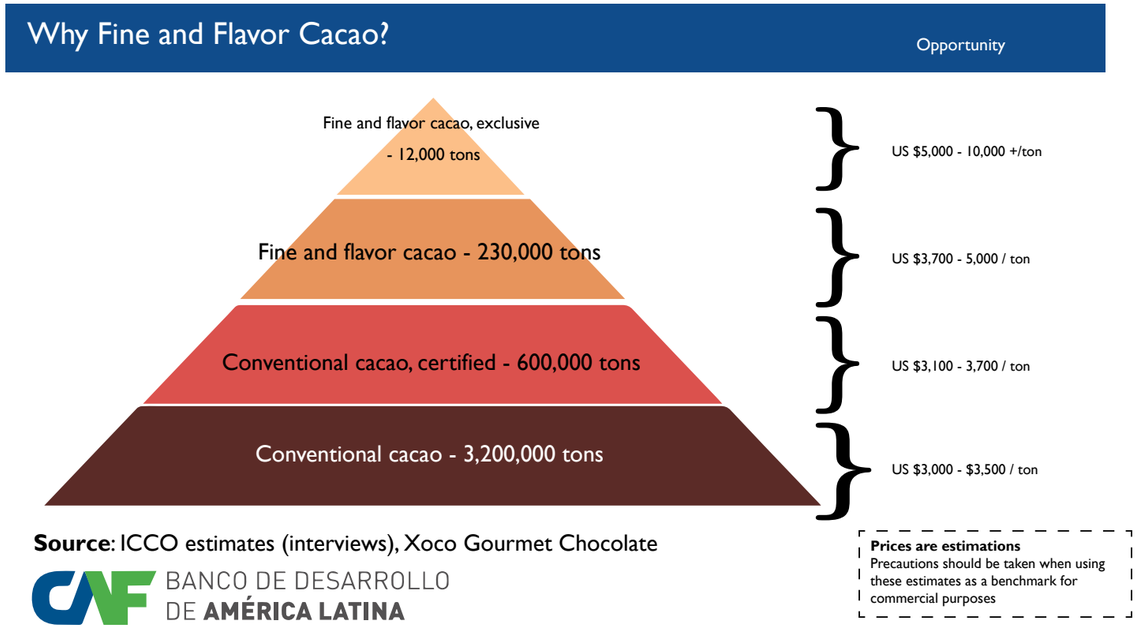
Source: FAOSTAT, 2017 and author's calculations based on news reports in Factiva Database.

on either the New York or London commodity exchanges. The origin premium now on beans from Colombia over the ICE (New York and London) or ICCO price is only US$80 per ton. This is the same premium that other Latin American countries receive and is lower than the country premium to Cote d'Ivoire or Ghana. Unit values from COMTRADE trade data for various Latin American origins are also consistent with low premiums simply based on origin (COMTRADE, 2016). The higher premiums on cacao sales that are found are on individual transactions between suppliers and high end or luxury manufactures or processors. There is a wide range of premiums on such transactions, based on anecdotal evidence – as organized data reporting for prices differentiated by cacao quality does not exist.

Confusion arises because there are small niche markets for high quality beans. Anecdotal accounts claim premiums can be very high, but this market seems quite small in size. While there are evidently 175+ specialty chocolate manufactures in the U.S. potentially demanding these ultra-premium beans, few are bigger than 100-150 MT per year, and all have existing suppliers (who might be displaced). Many acquire their quality chocolate from the bulk processors, many obtain their high-end cacao from West Africa, and many struggle financially. In one interview with a buyer from Europe, it was suggested that most of these firms may be purchasing only 30 MT, that 100 MT is quite a large enterprise, and that these firms often fail. While it is asserted that this sector is growing rapidly, it is from a very small base. It is unreasonable to expect that this segment will become a large share of the cacao market in the foreseeable future.

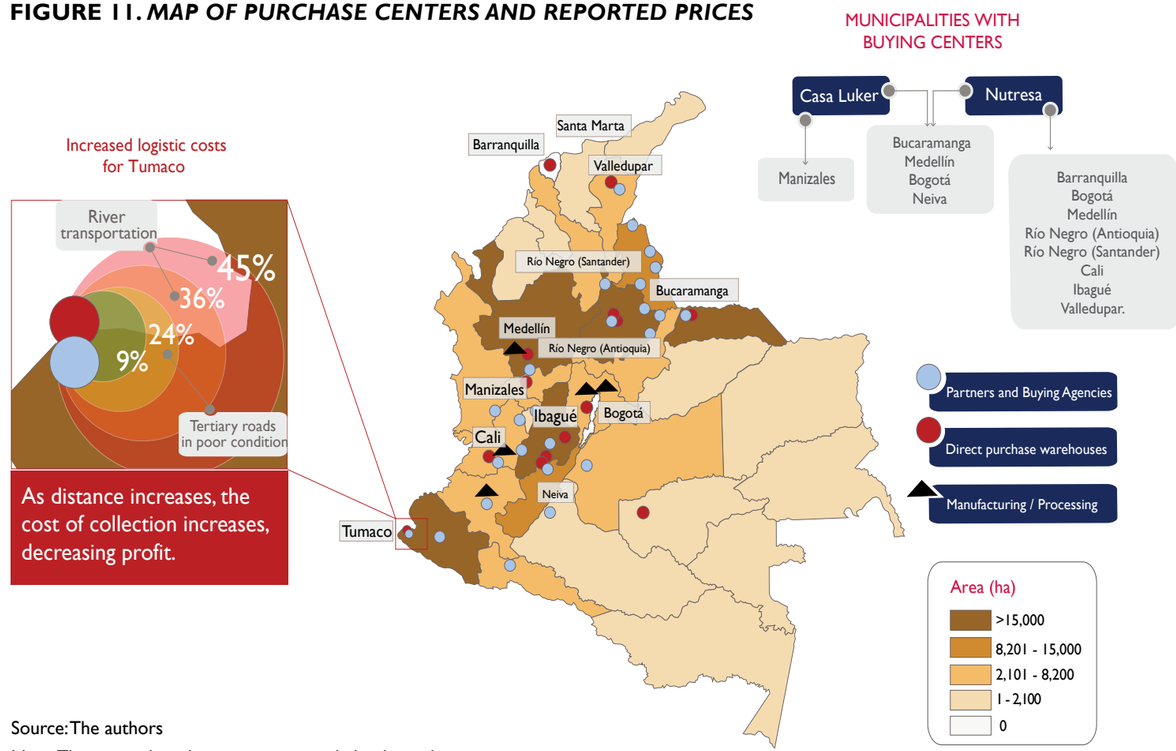
In other markets that pay slight premiums over the NYMEX, LIFFE or ICCO price, such as the certified market, there is some data, and it shows supply racing well ahead of demand. Moreover, fair trade premiums are too

FIGURE 10. ***GLOBAL CACAO MARKET SEGMENTS, FROM THE LATIN AMERICAN INITIATIVE FOR CACAO***



Source: From a presentation by the Latin American Development Bank (CAF) at the ICCO World Cocoa Conference, based on an interview with Xoco, a fine and flavor cacao promoter in Central America (Vignati, 2016).

FIGURE 11. ***MAP OF PURCHASE CENTERS AND REPORTED PRICES***



Source: The authors

Note: This map is based on interviews made by the authors.

Adobe stock

low to be relevant to current market conditions, even after the recent fall in global prices. There is ongoing discussion as to whether those price targets and associated premiums should be raised, but excess supply of certified cacao suggest it would be hard to market that cacao at higher prices (Fountain & Hütz-Adams, 2015).

Future price estimates for global cacao trade by quality segment remain problematic. The most widely used figures we encountered come from an presentation by a representative from the Corporacion Andina de Fomento (CAF) based on an interview with Xoco, a 'fine and flavor' promoter in Central America (Figure 10) (Vignati, 2016). The only cited reference for the calculations is Xoco Gourmet Chocolate. Prices reported for the cacao segment seems excessive given interviews conducted with specialty cacao traders and the Fine Cacao and Chocolate Institute in the US. Those interviewed reported lower estimates both in terms of volumes and prices. Key traders such as Atlantic, which focuses on 'fine and flavor' and certified cacao reported much smaller demand, much lower premiums, and slow market growth (personal communications, Richard Fallotico, ECOM). Finally, the CAF presentation itself recommends against using these figures for commercial operations. These data are not based on observations of actual market transactions, as even the bulk cacao price is exaggerated, being above the highest level the ICCO price has ever achieved. Despite these flaws, versions of this figure have continued to proliferate across Latin America, leading to an explosion of 'fine and flavor' cacao initiatives and not due to demand.

In the case of the producer organizations that are lucky enough to access a premium channel, the increased price paid is usually only received by a small number of producers for small volumes of cacao. This is seen in particular for Taza Chocolate, one of the largest companies with Bean to Bar chocolate in the USA that have a direct marketing program. In their transparency report from 2016, they document that the price premium is less than US$500 above the bulk cacao price for high quality certified organic cacao and is paid to less than 2000 producers for 233 MT of cacao (Taza, 2016). This is the equivalent of each producer selling only 114 kilos of cacao. What is happening is that only a very small proportion of the total producer's production is dedicated to this market, the rest is sold as bulk cacao on the local market. This is clearly an important market for those producers who are able to participate, but it is not necessarily relevant for a large number of small cacao producers.

As can be seen in Figure 11, the producer prices (prices paid at the central buying centers) and reported by Fedecacao and published in the databases of FAO, has followed the world cacao prices of the ICCO and they are above the majority of producer countries in the rest of the world. Based on our interviews and follow up conversations with Fedecacao and secondary literature, we encountered that there are areas that traditionally have not been cacao production zones (remote areas, post-conflict zones, indigenous communities) where the prices are much lower, reflecting the high cost of collecting and transporting the cacao to buying centers (Figure 11: Medellin, Bogotá, Cali, Bucaramanga, Manizales) and the lack of market information. For example, the prices that producers received in July in Santander near the city center were COP$8,000 per kilo, while producers in the Sierra Nevada region were paid COP$6.300 per kilo. The majority of cacao producers worldwide maintain that they should be paid a fair price for their crop. In the case of Colombian cacao producers, the prices they receive are based on international prices and real transaction costs.

POST-HARVEST PRACTICES & PRICES

Post-harvest practices (drying and fermentation) are critical to the quality of cacao beans sold. At present, price premiums for high quality cacao may not adequately compensate farmers for extra costs that are incurred when high quality standards are desired. Farmers are receiving only a slight price increase for the added labor of careful fermenting and drying correctly. The system now in place provides farmers an extra COP$200 per kilo on sales at COP$8000 per kilo. Through our multiple interviews, producers suggested that the added labor cost should have a price premium of around COP$1000 per kilo instead of COP$200-300 per kilo. It should be borne in mind that production costs are below prices paid even at US$2000/MT, but incentives are not in place to encourage the production of higher quality cacao.

In spite of the rhetoric about needing additional higher quality cacao throughout the supply chain, the actual low premiums being paid for quality suggest that it is not a scarce resource. Farmers typically bring well-fermented cacao to points of aggregation as opposed to traders going out and purchasing cacao at the farm. The vast majority of this cacao is fermented on farm as opposed to being sold wet or "en baba". Currently, due to a lack of demand for quality and the need for consistency, all qualities of beans are typically mixed during the aggregation process. Most buyers reference "Norma ICONTEC 1252", which defines different classes of cacao and standards for differentiating. Table 6 provides the minimum standards used for qualifying cacao and was shown to us at all of the buying stations when we interviewed the buyers and traders. The issue is whether the incentive or compensation for their added work is enough to do a good job.

Some advocates of selling on high quality markets question whether farmers can ferment and dry properly, so they pursue

TABLE 6. *CACAO BEAN QUALITY STANDARDS*

Requirements	Prime	Bulk	2nd
Moisture Content in % (m/m). max	7	7	7
Impurity, foreign material content in % (m/m). max	0	0.3	0.5
Moldy beans, number of beans/100 beans	2	2	3
Insect damaged beans and/or germinated, number of beans/100 beans	1	2	2
"Pasilla" beans, number of beans/100 beans	1	2	
Content of inner bean cotyledon in % (m/m). min	-	-	40 - 60
Mass (weight), in g/100 beans, min	120	105 - 119	40
Well-fermented beans, number of beans/100 beans, min	65	65	60
"Pizarroso" beans, number of beans/ 100 beans, max.	1	3	3

Source: Norma Técnica Colombiana NTC 1252-Cacao Beans ICONTEC, 2003

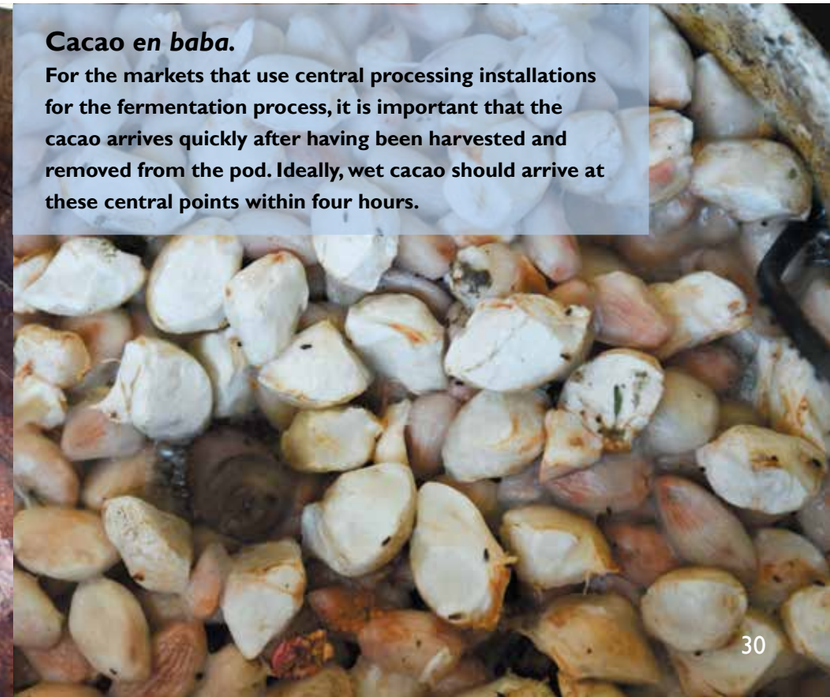
Fernando Rodriguez Camayo, CIAT

A *casa elba*.

Colleen Kelly, Purdue

A fermentation box.

Neil Palmer, CIAT

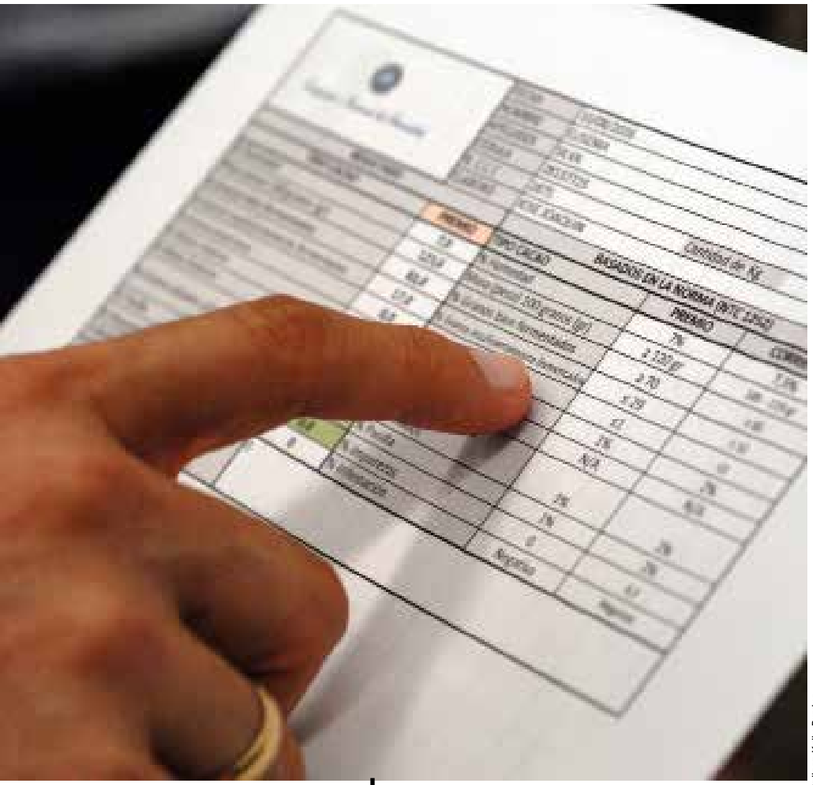


Cacao *en baba*.

For the markets that use central processing installations for the fermentation process, it is important that the cacao arrives quickly after having been harvested and removed from the pod. Ideally, wet cacao should arrive at these central points within four hours.

The average number of beans per pod can vary widely between cacao varieties, 20-60 beans per pod.

Colleen Kelly, Purdue



Colleen Kelly, Purdue

A Nutresa employee explains the cacao bean quality requirements outlined by Technical Norm 1252.

business models where these activities are conducted by producer organizations or chocolate manufacturers. Some international clients seeking luxury cacao for craft bars demand highly controlled fermentation conditions to produce specific flavor profiles. Meeting their requirements has led to the sale of cacao en baba (cacao still in its mucilage) to a centralized fermentation and drying facility managed by a producer organization or chocolate manufacturer as standard practice. The share of these types of farmers in the national production is unknown, but likely small.

Increasing infrastructure (fermentation stations and drying areas), whether on farm or by a processor, will have a cost that will need to be covered by someone. A business that chooses this route will need to build these costs into their business plan and not expect foreign donor agencies to cover these costs, which will limit the sustainability of both the business and the practice of purchasing wet cacao and processing for the farmer. It is also important to take into consideration that this is a value-added practice that accrues funds to the farmer if they do a good job at maintaining quality. It is possible that by removing this additional income generating activity from a farm, there will be less money flowing into the household income and farmers will be further deincentivized from caring for their cacao and producing more quantity and at a higher quality. If a farmer does choose to ferment and dry at home, they will need access to credit, training, and a reasonable expectation that he or she will be able succeed in producing and selling cacao so that these debts can be repaid. Processors and farmers will need to evaluate several factors (such as time, distance, financing, premiums or discounts due to quality) to determine which is the appropriate path; selling/buying *en baba* or fermented and dry.

A Nutresa employee perforates sacks of cacao with a hollow metal spike to obtain bean samples in order to perform a quick visual quality check as deliveries arrive.

Colleen Kelly, Purdue

FIGURE 12

THE CACAO SUPPLY CHAIN *Following the bean to finished product*

Inputs

- **Plant materials**
- **Shade trees/plantains**
- **Tools**
- **Fertilizer, compost**
- **Chemical controls**
- **Irrigation**
- **Fermentation & drying structures**
- **Land**
  *~ Ave. farm size is 13.9 ha with 3.1 ha planted in cacao.***
  *~ 165,006 ha of cacao (2016).**

Cacao producer

- **Activities:** Site preparation, planting, pruning, renovation, maintenance, on-farm fermentation and drying, and transporting cacao.
- **Certifications:** Rainforest Alliance, Organic, Fair Trade.
- **National production**
  ~ 54,798 MT (2016)

Commercialization

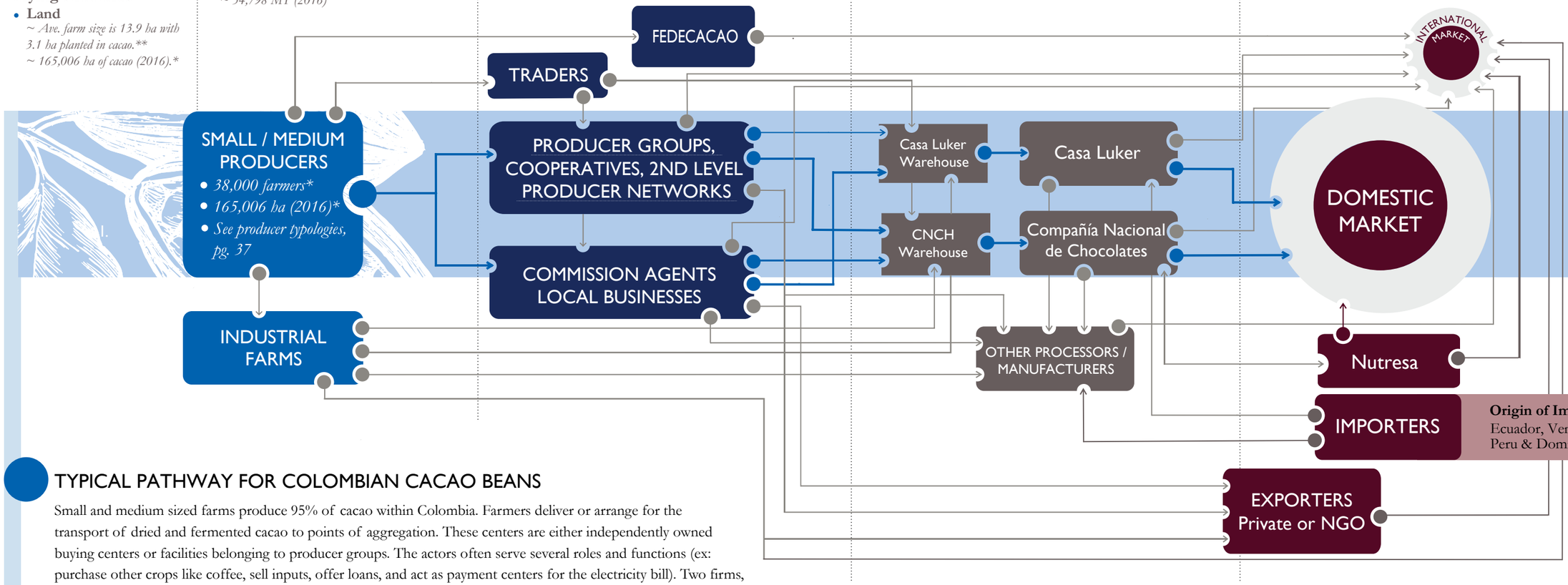
- **Transportation**
- **Sifting impurities**
- **Quality control & testing**
- **Fermenting & drying**
- **Differentiation** by quality, origin, flavor, certifications, or client specifications.

Cacao Processing & Chocolate manufacture

- Cocoa butter, powder, paste, nibs, liquor, couverture, chocolate mass
- Chocolate confections

Markets

- **Internal demand** for cacao reached 71,568 MT in 2016. 16,770 MT of cacao beans and cocao products were **imported**. 24,300 MT were **exported. Internal consumption** was 47,268 MT.*
- **Fedecacao** recently began buying and exporting cacao beans. Exports have increased from 125 MT in 2013 to 1,075 MT in 2016.*
- **Export Destinations:** Europe (51.2%), North America (30.2%), Asia (16.6%), Central & South America (1.6%)***.



TYPICAL PATHWAY FOR COLOMBIAN CACAO BEANS

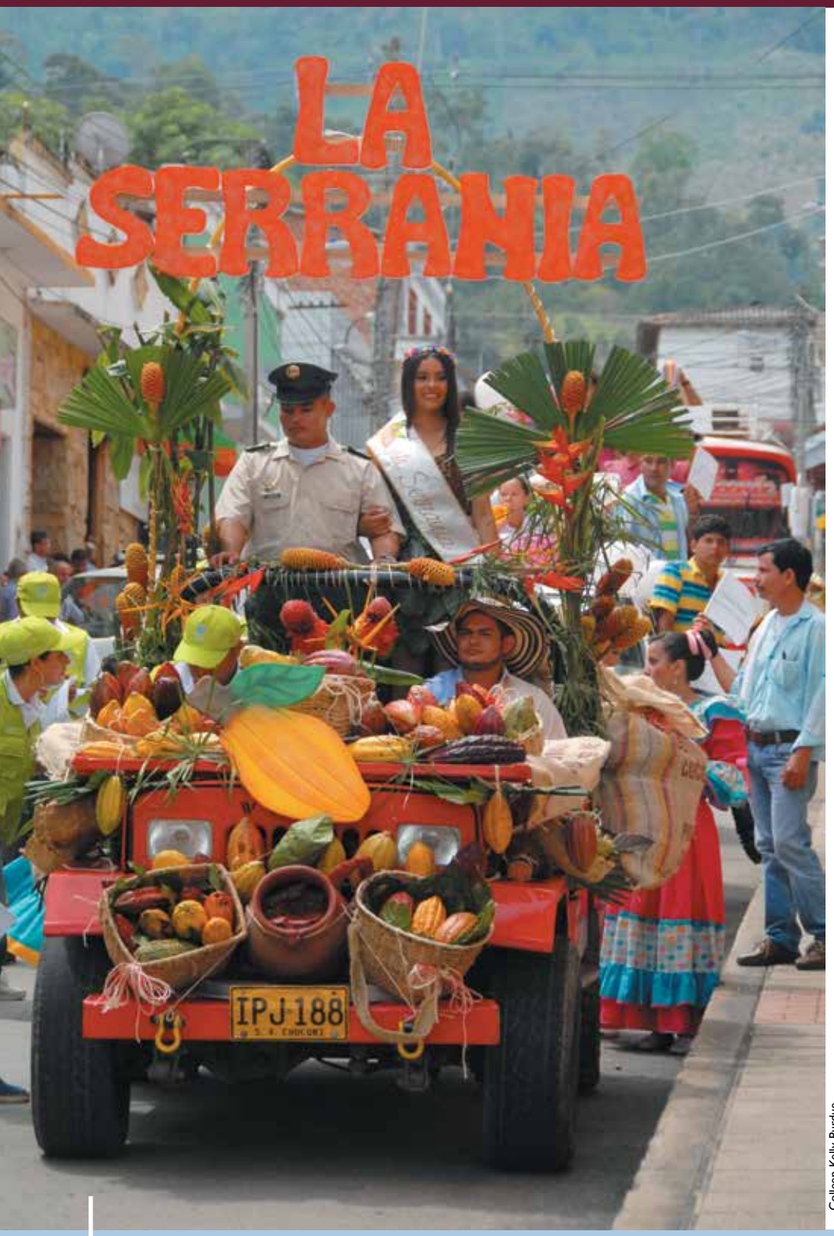
Small and medium sized farms produce 95% of cacao within Colombia. Farmers deliver or arrange for the transport of dried and fermented cacao to points of aggregation. These centers are either independently owned buying centers or facilities belonging to producer groups. The actors often serve several roles and functions (ex: purchase other crops like coffee, sell inputs, offer loans, and act as payment centers for the electricity bill). Two firms, Casa Luker and Nutresa, purchase between 80-90% of cacao production. Contracts are not used though agreements to purchase may be in place. The firms purchase between 30-55% of the cacao directly from farmers' organizations and the rest from independent buyers who are typically affiliated with one of the two firms. The cacao is transported via truck to regionally located company warehouses and transported to factories located in urban areas when needed. The companies process close to half of the cacao for drinking chocolate preparations for sale on the domestic market.

LOWER VOLUME PATHWAYS FOR COLOMBIAN CACAO BEANS

While increasing in number, large-scale plantations only produce a small percentage of the cacao. Some propose using the large farms as training, buying, and fermentation centers to suport surrounding small cacao farmers. Some small producers, especially ones in remote areas, rely on agents to sell their cacao. Fedecacao has begun to purchase cacao from farmers and producer groups with the goal of exporting. Craft bean-to-bar clients require beans *en baba* to control the fermentation process to specific standards, and selling wet beans is seen as a way to support farmers with limited experience with cacao and equipment to properly ferment. Many alternative pathways exist to shorten the chain between producer and consumer and to enter higher-value domestic and international markets.

** Source: Fedecacao, 2017*
*** Source: Fedecacao survey (2016) of 5,397 farmers in seven departments (Antioquia, Arauca,Huila, Tolima, Nariño, N. de Santander, & Santander).*
**** Source: COMTRADE, 2017; Note: Between 2012-2015, Africa and Oceana accounted for only 100MT of exports so they are excluded.*
Note: This diagram only describes the functional aspects of the supply chain. The researchers utilized a wider vision of the market chain that included business organizations, supporting services, and the economic framework. This "follow the bean" pathway operates in this larger context.

THE CACAO SUPPLY CHAIN
IN COLOMBIA



Colleen Kelly, Purdue

Seven municipalities surrounding San Vicente de Chucurí nominated contestants to represent them in the 2016 Cacao Festival beauty pageant.

A depiction of the Colombian cacao supply chain, seen in Figure 12, describes the functional aspects of the supply chain, illustrating the activities from production, to post-harvest, aggregation and transport, processing, marketing, internal consumption and export. This process takes place amid several layers of organizations and institutions that collaborate formally or informally. The processes and services occur within larger social, economic, political, environmental, and technological contexts. Several actors take on multiple steps within the physical production from bean to distribution of the final product, such as Casa Luker and Nutresa. Many institutions that play leadership roles, provide services such as technical assistance, provide financing, and help coordinate sector activities. Some actors such as Fedecacao and Red de Cacaoteros offer more than one support service. The larger private actors such as Casa Luker, Nutresa, and smaller ones (e.g. Cocoa Hunters, Mariana Cocoa, Manifesto Cacao) also provide some support services principally to producer organizations.

In Table 7, all of the actors found in the cacao supply chain in Colombia are outlined along with their roles or services that they provide.

TABLE 7. ***CACAO STAKEHOLDERS AND THEIR ROLES***

● **Indicates that the role is always or almost always fulfilled by this group**
○ **Indicates that the role is mostly or sometimes filled by this group**

See Glossary for abbreviations.

Actor	Production	Fermentation and Drying	Purchasing	Quality Assurance	Secondary Transformation (powder, etc.)	Chocolate Manufacturing	Export (beans)	Export (intermediates)	Export (chocolate)	Technical Assistance	Research	Production Inputs	Credit	Building Institutional Support	Transportation Services	Acreage Expansion	Examples
Producers																	
Small/Medium Producers	●	●		○												●	
Large-scale Plantations	●	●	○	○												●	Pacific Agri Capital, etc.
Average producer association			○	○						○		○	○			●	
Exceptional producer associations		○	●	●	○	○	○			●		○	○			●	Ecocacao, Aprocasur, Cortepaz, etc.
National Organizations																	
Fedecacao			●	●			●			●	●	●		●		●	
Red de Cacaoteros	●						●							●			
Public-Private Partnerships and Coordinating Organizations																	
Consejo Nacional														●			
ProColombia														●			
EPSAGROs										●							
Public Organizations																	
CORPOICA											●						
Universities										○	●						UNAL, U-Caldas
MADR														●			
Finagro													●	●			
SENA						●				●							
Instituto Colombiano Agropecuario (ICA)				●													
UMATAs										○							
Non-Governmental Organizations																	
USAID/USDA-funded projects and contractors										●		●		○		●	ACDI VOCA, TechnoServe
International and domestic NGOs										●		○		○		●	Swisscontact, etc.
Private Companies																	
Nacional de Chocolates / Nutresa			●	●	●	●	●	●	●	●		●	○*		○		
Casa Luker			●	●	●	●	●	●	●	●		●	○*		○		
Chocolate de Mesa producers			●	●	●	●			○								Girones, etc.
Fine Flavor Chocolate Bar Producers		○	●	●	●	●	○		●	○							Cocoa Hunters, Mariana Cocoa Co., etc.
Investment houses			●				●										Pacific Agri Capital
Trade houses (Exporting agents)			●		○		●										OLAM/ECOM, Fenicia Trading
Intermediaries			●	○								○	○				
Transportation providers															●		
Banks													●				Banco Agrario

*** Nacional de Chocolates and Casa Luker provide advance payment to producer organizations so that they have the cash flow necessary to purchase cacao from their farmers**

Source: Los autores, 2017.

A cacao producer marches in a parade during the 2016 Cacao Festival in San Vicente de Chucurí.

Colleen Kelly, Purdue

A cacao seedling.

Neil Palmer, CIAT

Cacao production in Afrocolombian communities in increasing.

Neil Palmer, CIAT

FARMERS

Based on our interviews with different types of farmers and certain ethnic groups, we decided to not divide the producers into large and small, instead we looked at their yield or land holdings, cultural aspects important to each region are equally important and should be visualized and incorporated. Taking into account the different voices, geographical location, economic and socio-cultural aspects we classified these systems into four approximate farm typologies for the Colombian cacao sector.

MARGINAL

This type of farm typically lacks adequate water and plants lack nutrition, resulting in trees dying. These areas are either not suitable for growing cacao or the plants fail due to bad agricultural practices. Farms typically have between 800 - 1000 plants per hectare with production below 300 kg / hectare. These types of farms are not profitable and new cultivation or maintenance of cacao plants may create risk for producers, especially if the area is not suitable for growing cacao. This type of farm usually does not meet the minimum quality standards and therefore prices paid to producers are low.

TRADITIONAL

This type of farm is commonly found throughout Colombia, and may be in heavy cacao municipalities or not. Plants receive occasional nutrition, pruning, and phytosanitary management, but it is usually in response to the presence of pests and diseases. These farms typically have between 800 to 1000 plants / hectare and yields between 300-500 kg / hectare (i.e. yield per plant is between 0.2 - 0.5 kg). They can be pure collection / extraction systems under normal conditions, and sometimes increased yield can be linked directly to a project or program. Its market segment is that of bulk cacao and it can support an average income below one minimum wage over a 10-year period.

TECHNICAL

This approach is usually purely economic and producers have access to capital and periodic technical assistance. These types of farms have access to water and apply technological packages according to the planted genetic material. Yields are normally between 1200 - 1800 kg / hectare, but can also be higher. This type of system is most frequently promoted, but is the hardest to find. It requires an investment of 12 - 15 million / hectare depending on the area and whether it requires irrigation or not. It supports higher employment and generates around the income of a minimum wage over a 10-year period.

These types of farms are found in the departments of Arauca, Santander, Huila and Tolima.

DIVERSIFIED

The size of this type of farm varies a lot, ranging from 0.5 - 15 hectare. The land has multiple uses, and is not only utilized for economic benefits, but also for food security and to meet livelihood needs in the territory. These needs include trees for wood, aromatic plants for health and / or condiments, and achieving environmental balance. These types of farms have between 600 and 700 plants per hectare with yields between 300 and 600 kg / hectare (i.e. yield of 0.5 to 1 kg / plant). This type of farm has improved cacao yields in thanks to rural development projects and programs that promote restoration with new material, as well as a combination of traditional and new growing practices. These programs often provide specialized technical assistance, as well as seeds and inputs that expand the growing area and increase yields.

These types of farms often struggle due to lack infrastructure and are vulnerable to armed conflict. However, diversified farming systems such as these have been able to meet the basic needs of producer families in times of crisis.

These types of farms are found in Caquetá, Cauca, Cesar, Chocó, Guaviare, Huila, Magdalena, Nariño, and Santander.

Based on our interviews and secondary literature review, there was some consensus that cacao bean quality and consistency could be assured by fermenting and drying at an aggregation center. There is also some interest by these larger scale cacao producers to purchase cacao from neighboring small-holder farms (satellite production system) to increase economies of scale and improve quality and consistency of cacao beans sold to exporters.

ORGANIZATIONS

Through our interviews and secondary literature review, we found that the cacao producer groups have a mixed track record in Colombia. For the most part, cacao producer groups were formed with the support of development programs such as MIDAS and ADAM, with the intention of serving as a conduit to receive inputs for establishing new plantations. These organizations can help farmers access resources that might otherwise be unavailable, such as offering access to credit, providing technical assistance, purchasing cacao beans, supplying production inputs, or quality control.

Based on our interviews with CELI and Fedecacao, access to group credit has been a failure because producers receive credit through the organization and if not paid or cacao is not delivered. However, there was no consistency for these services and many associations offered few services other than a means to support acreage expansion of cacao plantations through free trees.

We did find some highly functioning producer organizations (associations and cooperatives) that provide multiple services to their members. They play important roles in the supply chain by aggregating product, finding buyers for the cacao beans, providing technical assistance, and ensuring quality standards in their beans. Many of these associations are run as a business and they are often linked with private industry, selling the beans that have been aggregated into domestic chocolate processors or export agencies. Some also offer fermentation and drying services, secondary transformation or chocolate manufacturing, access to credit, production inputs, and export capabilities. Based on our interviews, the majority of cacao farmers do not belong to well established producer organizations.

Neil Palmer, CIAT

PRIVATE COMPANIES

LARGE PRODUCERS OF CHOCOLATE

Nutresa and Casa Luker comprise a significant industry presence in the cacao supply chain. Estimations of the total national production that these two firms acquire range from 80-90% (Corporacion Andina de Fomento, 2015; TechnoServe, 2015). In 2013, Nutresa and Casa Luker captured an estimated 85%. Colombina S.A. utilized 4% of national production, Chocolate Andino 3%, Chocolate Girones 2%, Comestibles Italo 1%, and all other processors shared the remaining 5% (TechnoServe, 2015).

Both Nutresa and Casa Luker supply the domestic market and export cacao beans, intermediary cacao products such as powder, paste, semi-elaborated products such couverture and semi-sweet chocolate, and finished consumer products. The majority of the production of both companies is for the domestic market, mainly for chocolate de mesa, bars for hot chocolate. Nutresa imports some beans, mainly from Ecuador and Peru because of its similarity in bean profile and quality. Casa Luker indicated that it does not import. Both firms commented in interviews that production quantity is their biggest limitation to expansion, not bean quality, factory capacity, or access to markets. Lack of technical assistance, plant diseases, and weak producer associations were cited as main reasons for low productivity. Both offer technical assistance to farmers, field days and demonstrations farms.

Nutresa and Casa Luker have networks of buying centers with warehouses for storing dried fermented cacao beans across the country. Both have centers in Bucaramanga, Medellin, Bogota, and Neiva. Casa Luker has an additional center in Manizales, while Nutresa is also found in Barranquilla, Cali, Ibague, and Valledupar.

Nutresa has played an active role in increasing cacao production for over 50 years. Currently as part of their "social compromise," Nutresa has a Productive Projects-Inclusive Business program. Through the Productive Alliance Support Project (PAAP), Nutresa forms alliances with farmers to assure the purchase of their product directly and will help provide technical, social and corporate support. Nutresa has two demonstration farms, a larger one in Magdalena Medio and a farm near Medellin.

Casa Luker is Colombian family-owned company that was

Neil Palmer, CIAT

Different cacao products and subproducts.

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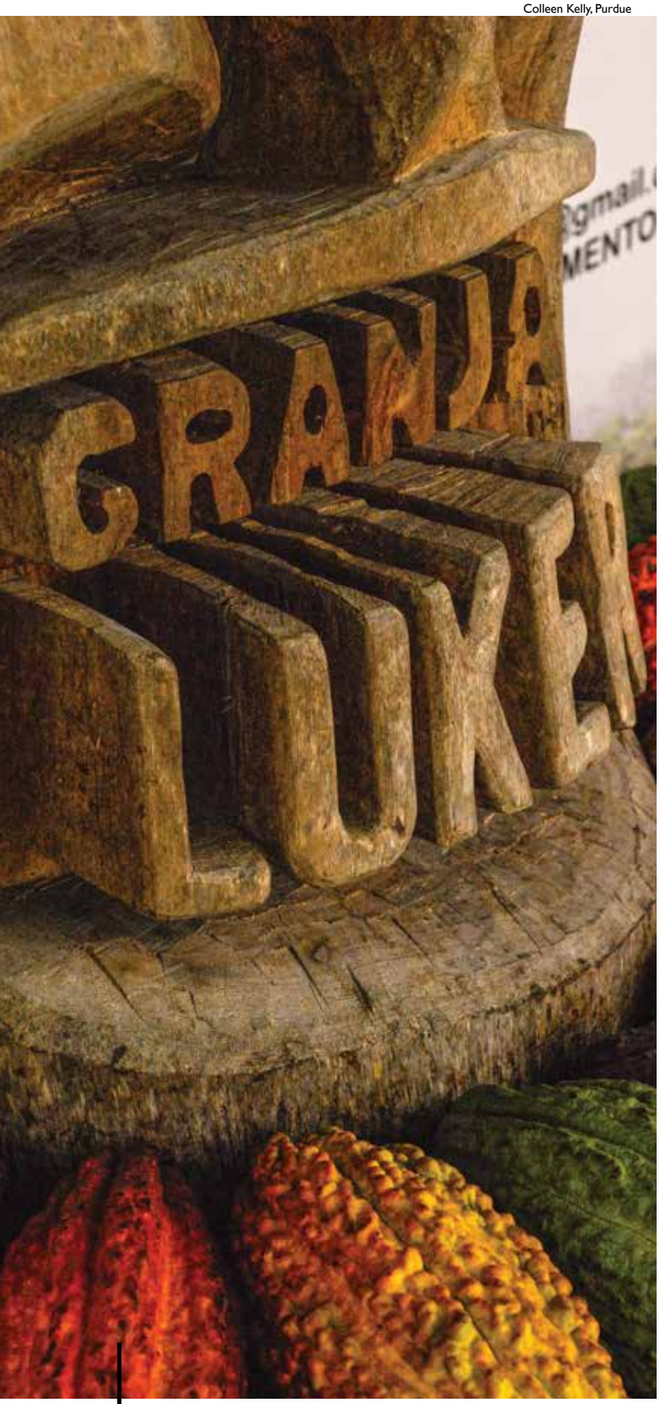
Colleen Kelly, Purdue



Granja Luker serves as a demonstration farm and training center for Casa Luker.

established in 1906 in Manizales. Casa Luker promotes and capitalizes heavily on Colombia's reputation of a source of cacao 'fine and flavor' types, and diversifies its product line by origin (Santander, Arauca, Huila, and Tumaco) and sensory profiles. Casa Luker also sells cacao derivatives such as liquor, powder, butter, beans. Casa Luker also has a model plot arrangement with some farmers. The farmer receives a subsidy from Casa Luker in the form of free training, plant materials, various farm tools, and supplies to improve his/her crop. In return, the farmer agrees to convert his or her farm into a model to be used to train other producers. Casa Luker demonstrates cacao production in three-crop cultivation agroforestry systems (wood, fruit trees or plantain, and cacao) which takes into account the temporal aspects of the system, timing production so that the farmer has one "main crop" and two others that support the system.

Most of the large processors in Colombia export a percentage of final product to regional and international markets. This bulk of this export consists of mass consumer products with a low unit value and relatively low cacao content often in the form of confectionery. In addition to these exports, Nutresa and Casa Luker manage semi-finished products which promote specific origins within Colombia. Examples of origin specific final chocolate products also exist but interviews with both Nutresa and Casa Luker suggest that these markets remain small.

NATIONAL ORGANIZATIONS

FEDECACAO

The Cacao Producers' Guild, Federacion de Cacaoteros (Fedecacao), represents 38,000 small-holder farmers with 165,000 planted hectares of cacao located in 22 departments. It is primarily dedicated to research, technology transfer, and commercialization support. It also administers the National Fund for cacao, a parafiscal fund collected through the Cacao Development Fee. According to the Law 67 of 1983, the fee is three percent (3%) on the selling price of each kilogram of dry cacao beans sold in Colombia. Its efforts are dictated by where cacao is sold, since that is the main traceability source for returning the fee to farmers. For example, if a producer has his or her farm in Bolivar but sells in Santander, the cacao is counted as being from the department of Santander, not Bolivar. Funds are thus allocated to the Santander Department instead of Bolivar, from where the cacao originated.

Starting in 2009, Fedecacao entered into an agreement with MADR to administer the Price Stablization Fund for Cacao (Fondos de Estabilizacion de Precios, FEP-CACAO). Fedecacao utilizes a price band mechnaism to collect assignments from or disburse payment of compensation to exporters. Given that not a single interviewee mentioned it, FEPCACAO appeared to be of little consequence. It has been relatively inactive in recent years, however this may change. In 2016, new operating regulations and methodology were adopted, and exports are expected to increase.

Fedecacao serves a number of tangible roles in the supply chain including the purchase of cacao and assurance of the quality that is being purchased. They are the primary providers of technical assistance, mainly based in high productions areas of the country. They have a training center in Rio Negro, Santander with a demonstration farm and areas for farmers to spend the night while receiving training. They also provide supplies, such as chainsaws, sealant, and fungicide for plantation renewals. They are a member of the Consejo Nacional de Cacao (see below), where they are helping to build institutional support among the many actors along the supply chain. They purchase a small quantity of beans, that have been well fermented, dried, and selected and sell at a premium, allowing them to act somewhat like a private business.

RED DE CACAOTEROS

The Red de Cacaoteros (Network of Cacao Producers) is an organization of 54 producer organizations from the six main areas of cacao production in Colombia. Their goals include working through producer organizations to export cacao. In addition, they conduct development projects funded by international development agencies. Their main roles in the supply chain are to purchase and export cacao beans for a relatively small number of cacao producers. They also work heavily with partner producer organizations to build institutional support to help them access international markets and guarantee quality of beans being exported, including finding international donor funds to support building fermentation and drying centers.

PUBLIC PRIVATE PARTNERSHIPS AND COORDINATING ORGANIZATIONS

NATIONAL CACAO COUNCIL

The National Cacao Council (Consejo Nacional de Cacao) is a sector-wide body comprised of producers, associations, private industry, governmental organizations, and Fedecacao. The Council was one of the first multi-actor working groups to be formalized by the Colombian Ministry of Agriculture and Rural Development (MADR) under its Supply Chain (Cadenas Productivas) division. The Council was formally established as a chain organization with a specific strategy to develop the sector, known in Spanish as an Acuerdo de Competividad, in October 2001. This agreement served as the basis for the development of a public policy framework for supply chain development supported by Law 811 of 2003 and Decree 3800 of 2006. According to Law 811, to achieve official recognition as a legally representative body for the supply chain, the sector must develop a

Colleen Kelly, Purdue

Participants in a workshop on pruning cacao trees to increase production.

Participants at a two-day workshop Bogotá (Oct. 2016) discuss strategies to improve the cacao sector.

common strategy to improve productivity and competitiveness, reduce transaction costs, develop strategic alliances, improve information flows, include small scale producers and businesses, promote sustainable natural resource management, strengthen human capital and a plan for research and technology development. Decree 3800 further developed this mandate indicating that the national government should provide direct support to the competitive agreements by incorporating them into government policies and budgets and provide priority access to these resources to members of legally constituted chain organizations. The goal of these policies was to establish representative bodies that could represent the needs of supply chain members, coordinate development strategies, interact with MADR and provide guidance on public initiatives relevant for the sector. The Council in coordination with the five regional councils, which represent the needs of key production areas, has played this role since its inception in 2001.

The five regional councils are found in Santander, Antioquia, Tumaco, Arauca and Huila. The goal of these councils is to mirror the coordination functions of the National Cacao Council but also adapt national strategies to regional needs. These constitute an important space to include recommendations for different production systems based on producer industries, adapt extension materials to local needs (i.e. which varieties, which densities, what management practices), flag regional research demands and dialogue with sub-national governments to identify investment needs and opportunities. An additional advantage of regional councils is that they provide a more accessible space for a wide range of actors to participate especially those who are unable to travel to Bogota and participate in a regular basis in the National Council.

The current Acuerdo de Competitividad running from 2009 to 2022 focuses on four key areas of collaboration: (i) production and technology transfer; (ii) investigation and innovation; (iii) market development; and, (iv) institutional arrangements. The role of the Council is to provide coordination around these topics, improve access to information, represent the interests of the sector with the national government and permit the implementation of sector-wide development strategies that benefit the Colombian cacao sector.

PROCOLOMBIA

ProColombia is a government agency of the Executive Branch of the Government of Colombia in charge of promoting Colombian non-traditional exports, international tourism and foreign investment to Colombia by providing domestic companies with support and integral advisory services for their international trade activities, facilitating the design and execution of their internationalization strategies, and by providing foreign companies with trade, legal, and educational information about Colombia's market, products, services and companies. ProColombia has been highly active in promoting foreign investment in the cacao sector, searching for new international markets for cacao, creating concise and visually appealing information resources, and hosting product expos and networking events,

EPSAGRO

This is a program that pays individual consultants to give technical assistance in cacao production systems. We were never able to find definitive information on how this program works, but an individual or organization who is qualified (has degrees or experience in the area of expertise) and has been certified by the MADR as a quality provider of technical assistance in certain crops, can then take on contracts at the departmental level. We are unaware as to how well this program has worked or how prevalent it is across the country, since we saw no signs of actual impact from the program.

PUBLIC ORGANIZATIONS

CORPOICA

Corpoica, is the agricultural research division of MADR. They play an important role in the supply chain since they set the research agenda for the cacao sector (National Agenda for Cacao Research), conduct cacao research, maintain cacao clonal gardens and germplasm, provide demonstration farms, and provide technical assistance to trainers, "train the trainer" model. Most of the research being conducted by Corpoica falls in the area of genetic improvement, best management practices, disease management, and organoleptic qualities of different varieties.

UNIVERSITIES

Similar to Corpoica, Universidad Industrial de Santander, and Universidad Nacional in Bogotá are conducting research within sections of the supply chain. It seems that most of the research that is currently occurring is in the area of cacao varieties, cadmium, sensory characteristics, disease resistance, and management practices (agroforestry, pruning, fertilization). There is little being done in the area of social and demographic issues, economics, or supply chain analysis.

Programs like USAID's MIDAS were initiated to replace illicit crops with licit ones such as cacao.

MADR

The Ministry of Agriculture and Rural Development (MADR) develops, drives, coordinates, and evaluates policies through the Dirección de Cadenas Productivas for the cacao sector. The ministry also develops actions to promote alliances between national and department institutions such as Corpoica, SENA, ICA, Finagro, local governments, and others, which leads to the implementation of plans, programs, and projects.

FINAGRO

Finagro, Financing Fund for Agriculture, through the use of financial instruments and incentives for investment, supports the development of the rural sector in Colombia. Finagro provides funds to retail financial institutions (such as Banco Agrario) who in turn lend to farmers. It is charged with implementing different credit policy instruments for rural development (agricultural risk management, rural investment promotion, productive and social strengthening) and financial services (credit lines, access to financing, and regularization of overdue agricultural portfolios and partial or total relief of debts). The economic objectives for the rural sector are outlined in the National Development Plan.

SENA

The National System of Training (SENA – Servicio Nacional de Aprendizaje) is part of the MADR and is responsible for the agricultural training programs. SENA provides technical assistance and has a production factory in Bucaramanga where they produce truffles and bonbons and provide training for other small scale chocolate processors. They certify professional training programs that have been based on relevant criteria, quality, convenience, and flexibility to all Colombians and certified foreign residents interested in studying. SENA establishes mechanisms of direct and permanent interaction with unions, companies, governmental and non-governmental institutions, and educational institutions of the country, to update and adjust curriculum designs of existing training programs.

Left Top: Cacao pod infected with *Monilia*

Left Bottom: A professor from the University of Caldas teaching students about taking care of cacao in the model farm, Granja Luker.

Above: Research on the different varieties of *Monilia* on Petri dishes.

Photos this page: Colleen Kelly, Purdue

UMATA

As part of the decentralization process initiated with the Colombian Constitution of 1991, Municipal governments established technical assistance units called Unidades Municipales de Asistencia Técnica Agropecuarias (UMATA). The UMATA form part of the municipal government structure and their mandate focuses on providing technical assistance to all agricultural and livestock activities within their jurisdiction. Under the agricultural sector policies established in the aftermath of the 1991 constitutions, the UMATA should depend on the local Municipal Council for Rural Development (Consejo Municipal de Desarrollo Rural, CMDR), chaired by the Mayor and comprised of representatives of other public sector actors and producer organizations. The CMDR holds ultimate responsibility for the formulation of Municipal level rural development strategies. At the Departmental level, the UMATA connect to the Secretary of Agriculture which, in turn, relates to the Ministry of Agriculture and Rural Development at the national scale. In practice, the capacity and effectiveness of any given UMATA depends greatly on the funding provided by the municipal government and the importance given to rural development by the mayor. In addition, UMATA often fulfill obligations in addition to providing technical assistance to producers in the field (i.e. nutrition classes, animal vaccines).

INSTITUTO COLOMBIANO AGROPECUARIO (ICA)

The Colombian Agriculture Institute (Instituto Colombiano Agropecuario – ICA), advises in the formulation, preparation, and implementation of policies, plans, programs, projects, measures, and procedures to protect plant health, to protect the rights of breeders of new plant varieties, to verify production quality, commercialization and the safe use of seeds and agricultural inputs. Their objectives are to improve the phytosanitary status of plant production, by developing plans for the control and eradication of pest control.

INTERNATIONAL DONOR AGENCIES

Colombia has had a number of international donors and non-governmental organizations (NGO's) support activities in cacao with a focus on planting new areas, developing producer organizations and establishing additional processing capacity both at the farm and collective level. They have also been involved in technical assistance to cacao producers. Some key countries active in this space include the US, Canada, the European Union and Switzerland. NGO's working on cacao include both Colombian organizations tied to national programs such as Productive Alliances as well as international NGO's implementing donor supported projects. Examples of NGO's active in cacao include Socya, Swisscontact, ACDI-VOCA, Chemonics, Lutheran Relief Services, and others.

CACAO PRODUCTION
BASIC CONCEPTS

Colleen Kelly, Purdue

Cacao is produced in agroforestry systems where the shade trees provide services such as nitrogen fixation, food for humans, and refuge for wildlife.

A contextual understanding of what is found in a Colombian cacao farm, planted predominantly as a mixed agroforestry plantation, can be helpful for delineating how cacao plays a role in the household income. Cacao trees can be planted at a density between 100-1000 trees per hectare. In our interviews with farmers we saw wide variations in cacao production systems. In Colombia, cacao producers normally establish and manage their cacao plantations under shade using various configurations depending upon climate, soils, household food needs and potential for generating income. These arrangements tend to include banana plants, fruit trees, and taller shade trees.

While some farms were managed extremely well and yielding upwards of 1,500 kilos/ha, others were struggling to produce 400 kilos / ha. When cacao production was well-managed, it was clearly the primary business of the owner. Regular fertilization and disease control were carried out by family labor, and hiring labor was usually a necessity for harvesting, pruning, and weed control. Among the farmers with lower yields, cacao might be one of many income-generating activities and little or no time is spent fertilizing, pruning, or controlling diseases. Best cultural practices should include fertilization (up to four times a year), pruning to maintain a shorter stature and more open canopy for flower production and fruit setting, weeding, and disease control. In especially dry regions, such as parts of the Sierra Nevada, successful farmers also had access to passive irrigation systems. The MADR national plan (MADR & Consejo Nacional Cacaotero, 2008) and Grand Alianza mention these same practices as a means for increasing production. However, improved management practices come at a cost. Agricultural costs have increased in the last decade. According to a report compiled by TechnoServe and ANDI (2015), over the last decade, labor costs have gone up 97% and the price of urea has increased by 49%.

Neil Palmer, CIAT

Cacao seeds are covered in a mucilage that contains sugars that are essential for the fermentation process to produce the chocolate flavor.

Location matters in Colombia, since prices vary (local input costs, transportation costs, etc.) and environmental factors can impact production levels, disease incidence, and varietal differences. For farmers newly engaging in cacao farming, high substantial upfront costs must be incurred and income from cacao does not accrue until several years later. Early on farmers grow other things in order to ensure income. As the cacao matures, farmers may (or may not) incompletely specialize and spend more time and energy on their cacao and less on other crops.

Given the long lead time needed for cacao to produce, income from fruit trees and banana plants can be important to a farmer's livelihood. Banana plants produce for a few years, until the cacao trees begin to produce. By the time the cacao is ready to be replaced, the shade trees, which tend to have good timber quality, are ready to be cut down and sold. A producer's ability to harvest trees for economic purposes for timber are mainly limited because of governmental policies.

CACAO VARIETIES AND PLANTING MATERIALS

One of the objectives of the Cacao for Peace program is to investigate the cacao varieties found in Colombia. Numerous entities (Fedecacao, Corpoica, Nutresa, Casa Luker, CIAT) have developed and assessed cacao varieties that improve yield, resist diseases, and may be adapted to local Colombian environments. These varieties appear to be capable of much higher yields, but there are numerous reasons why they are not having an impact on yield increases in the country. Many producers do not have access to these new varieties, they have not been mass produced and available to all regions of the country, and many have not been vetted to ensure that they are suitable for the different regions and microclimates.

Another limiting factor is possibly due to plantation management practices, including sufficient amounts of applied fertilizer and correct pruning practices. We observed a mixture of cacao varieties in the plantations, where they are all harvested, fermented, and intermingled together. In specific cases where plantations utilize good management practices (fertilizer use, appropriate pruning techniques, etc.), a yield boost can occur. Because there are numerous entities competing to find the next high yielding variety, there is little collaboration and trust.

Experimental stations realize high yields with the available varieties, however in their competition with each other, these entities do not enhance the reputation of Colombian cacao science. The collaboration that has occasionally occurred sometimes in the past seems prone to break down. Mistakes may have been made in the past to rush new varieties to market. Available varieties seem to offer tradeoffs between yield and disease resistance on the one hand and flavor profile on the other.

POST-HARVEST MANAGEMENT

Post-harvest management includes fermenting cacao beans, drying them, and storage. Investment in wooden fermentation boxes for properly fermenting cacao are the industry norm but in our conversations with producers many commented that cacao is also fermented in sacks. This contributes to low consistency and/or incomplete fermentation which negatively impacts final quality. In the Santander region, the most productive farms had invested heavily in post-harvest infrastructure, such as casas elbas, which provide removable rooftops for effectively drying cacao and protecting it from rain. Consistency in drying is lacking, because the quality of on-farm drying locations and practices differs among farmers. There are some exceptions to the inconsistency in fermenting and drying, where beans are being purchased

There are a large variety of different types of cacao in Colombia. One can find a high diversity of cacao types on a single farm. These are high-yielding trinitario varieties.

wet, en baba, and a centralized area performs the post-harvest practices on aggregated cacao. Lack of capital to invest in improved post-harvest infrastructure (fermentation boxes and elbas or drying areas) was mentioned in numerous cases by producers. There is a general understanding that everyone would like to have improved infrastructure to maintain high quality cacao although we also received anecdotal evidence of centralized processing facilities that were underutilized.

TECHNICAL ASSISTANCE SERVICES ALONG THE SUPPLY CHAIN

In Colombia and often in much of Latin America, technical assistance usually focuses on production and post-harvest practices to ensure that farmers know how to produce a crop. In our study, we found that those giving technical advice have strategies that can increase yield substantially. However, while they have been successful in increasing yield for some farmers, they have not had a widespread effect on yields nationally. Also, the technical assistance model currently being used and largely based on one-on-one interactions with farmers, is a resource-intensive and expensive approach. Hence, the reach is limited by budget constraints.

With the potential to increase yield, the need for increased supplies just to meet national demand, and the support from donors and the government, many actors have gotten into the technical assistance business. Messages are not always consistent and with so many different people giving out information it is challenging to make sure the content is correct. We found that Fedecacao, Casa Luker, SENA, Nutresa, EcoCacao (and other farmer associations), Corpoica, and international development agencies all provide some type of technical assistance services and yet they are rarely coordinated, validated, or made consistent to ensure a clear message is delivered in a format that is best for the farmer and in a timely fashion. Competition among technical advice providers has at times generated mixed messages to farmers. When numerous organizations are taking on the responsibility of providing technical assistance, there is a need to provide some form of backstop to ensure accurate information is being provided to farmers.

The manner in which technical assistance services are funded results in a non-integrated, patchy implementation. The law states that state and local governments are responsible for providing technical assistance to small and medium sized farms. Municipalities develop programs to receive federal funding and hire a provider such as Epsagros to implement the desired program. Technical assistance programming timeframes follow funding cycles and trends in the cause célèbre. The resultant technical assistance takes the form of short-duration projects rather than stable programming with impact assessment. We were told this lack of sustained extension programming is especially problematic when combating systemic, persistent problems such as *Moniliphthora roreri*.

Funding structures for technical assistance services also greatly impact program delivery and coverage. We

Photos this page: Colleen Kelly, Purdue

The participants at a workshop supported by Fedecaco, helped farmers analyze their own cacao chain to look for new strategies to improve the sector.

Fernando Rodriguez Camayo, CIAT

A Fedecacao employee demonstrates how to prepare a cacao cutting to make a graft.

Colleen Kelly, Purdue

One way to secure a graft to an established cacao tree.

Colleen Kelly, Purdue

found that the farmers in Santander largely had access to high-quality technical assistance and that farmers had a favorable opinion of Fedecacao. In other areas, Fedecacao was viewed as absent or spread too thin and unevenly. Colombian law directs Fedecacao to allocate the 3% Cacao Development Fee back to the areas from which they were obtained. Fedecacao's programs and projects, therefore, must prioritize attention to regions already producing large amounts of cacao rather than emerging areas. For there to be large scale sectoral growth, there needs to be resources allocated such that all growing areas receive some attention. If it cannot be done by a sole entity, then all the more reason for fostering effective collaboration. The infrastructure of market chain exacerbates this issue further. While the fees should be assessed at every transaction, in reality, fees are collected at central buying centers. When cacao from distant areas is brought in for sale by a trader, it invariably crosses jurisdictional lines. The fees are linked to the point of aggregation rather than production as are any funds that are reinvested in the region.

There is also a mismatch between the financial support structure for cacao technical assistance services and the reality of the diverse farming system of small-stakeholder farms. Cacao is often grown with multiple crops but services are offered from providers primarily interested in increasing cacao yields and quality. Offering extensive advice for integrated systems is especially critical when expanding cacao to new areas in order to support income and household food security during the multi-year gap between planting new trees and harvesting the first pods.

Fedecacao does manage a beginning farmer program at all of their offices when feasible, both from a personnel and financial perspective. One farmer in the jurisdiction of the Rionegro Fedecacao office who was just starting, implied that when someone starts out Fedecacao visits them at least ~4 times during the first year. It seems that information on new farmers tends to reach Fedecacao either through word of mouth ("Juan's neighbor is planting cacao this year") or when the new farmer contacts them, so it is doubtful that the programs are found in areas where cacao is not an important cropping system. It is much easier under current technical assistance models to work with farmers who already have experience with cacao, and in regions where cacao is prevalent so that neighbors can reinforce messages. If new "post-conflict areas", where cacao is not now prevalent, are to realize expanded production and high yields, even more resource intensive support services will be required. It is not sufficient to just subsidize the cost of planting trees and hope that new farmers succeed. Oftentimes these farmers are in areas where the infrastructure is not in place to earn a higher price for your cacao. Traders infrequently stop by to pick up cacao purchases because there is not enough supply for their trip to be worthwhile. Input costs can be higher in areas where infrastructure has not been established or the inputs might not even be available. Fedecacao's presence is often lacking in areas that do not have high populations of cacao farmers. New organizations have sprung up in these areas to support cacao farmers but their programs are usually tied to donor dollars and when the money is no longer available these organizations leave the area. Even though there is a national policy for research and development specifically for cacao, in reality there is no practical evidence that consistency and defined roles are part of national institutions to follow these policies.

The current technical assistance system in Colombia is costly, unstable, inconsistent, unevenly distributed, and disconnected from research, innovation, and education. Few stakeholders in extension, policy, or research view cacao as part of an integrated system. Programs involving youth are almost entirely absent, an unfortunate exclusion given the utility of youth programming in diffusing innovation to older family members and training

For many in Santander, cacao culture is "in their blood."

Colleen Kelly, Purdue

the next generation of producers.

TARGETING DOMESTIC VERSUS EXPORT MARKETS

There is a high potential to meet demand in domestic and bulk export markets, so if more cacao is produced, it is likely to be sold. Meeting that demand can raise incomes of small producers and increase employment in rural areas.

We observed several distinct approaches to tapping export markets for luxury cacao and paying price premiums. Some models are more realistic than others in light of the demand for cacao in Colombia and on international markets. The luxury cacao market is competitive business, and we found initiatives to produce and export fine flavor, single origin, or bean-to-bar cacao in a number of other Latin American countries Based on these initiatives, Colombia should not expect to quickly become a large supplier to higher end cacao markets of sufficient size to employ a large number of farmers.

There have been efforts to tap these markets ongoing in Colombia for a number of years (>5). To date these efforts have exported only a very small volume of cacao, and so benefited only a few farmers. Moreover, some started by offering high premiums over the international price, but those premiums have shrunk as time passes – since the captured value is not from farmers' activities but by the exporters' activities. The "socialist business models", where farmers are paid more than the value they generate, are not sustainable. When processors are under financial stress, they will reduce the prices paid to farmers. The relative scarcity of models such as Taza and Cocoa Hunters, who have paid farmers premiums for higher quality cacao, seems to indicate limited market appetite for these products as well as other income opportunities for farmers that may be more profitable. The demand for this chocolate is quite small, so the true impact for poverty reduction on a large scale using this business or development model is questionable.

Emphasis on expanding cacao to sell in ultra-premium markets is a mistake because 1) expected premiums are exaggerated and have not been realized in sales for Colombia, 2) the market niche for ultra-premium cacao may be growing, but it is still very small and highly competitive, 3) the value generating activities to attract these premiums are marketing and post-harvest processing, 4) premiums will accrue to entities conducting these activities, 5) beans to supply this ultra-premium market are readily available, even in surplus – hence low premiums should be expected (as is the case for certified sustainable cacao), 6) processing can overcome flaws and sort out low quality beans, 7) past longstanding efforts to penetrate this market in Colombia have generated only very small exports, 8) premiums to farmers have shrunk, since they are not the entities creating value.

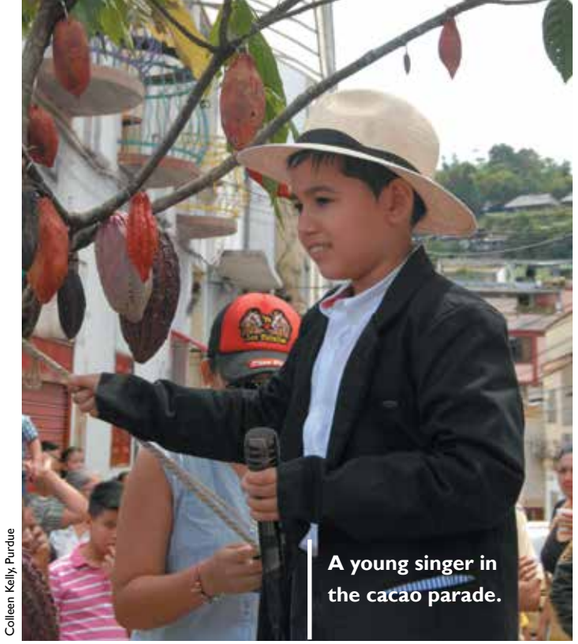
In order to reach Cacao for Peace's and many development projects' goals, we must be able to scale up these types of activities to reach the maximum number of people. Foreign or domestic aid should bring livelihoods for farmers and employment opportunities, not just a few successful but very small businesses. The goal for USAID and other foreign donors should be to provide the appropriate technical support to increase production, develop consistent post-harvest processing and get it marketed. Extension will play a key role if the available land (and labor) can be found with the expansion into new areas.

FINANCING

Colombian government has a history of subsidizing credit for agricultural activities. Credit subsidies exist, and can be quite large. While many government agencies appear to offer subsidized credit for agricultural projects, this has not been taken advantage of as much as it could be. Farmers cite difficulties in filling out paperwork and slow timeline from financial institutions as barriers to accessing credit, despite assistance offered by some extension services and producer associations. Several experienced cacao technical experts told us of their difficulty in accessing credit specifically for purchasing land, as many banks do not see cacao as a profitable crop. Other producer organizations have attempted to take advantage of government programs and only certain members have succeeded. More proactive assistance from government financial institutions may be needed to connect farmers to the financial resources they need. One function of technical assistance programs should be to help farmers gain access to credit, whether these subsidized programs or through commercial loans. Repayment plans also need to be sensitive to the long-term requirements of growing cacao, which often takes several years to become profitable. As such, cacao is not a good option for micro-credit. Since cacao often takes several years to become profitable, repayment plans also need to be sensitive to long-term requirements. For cacao, loans generally have a three-year grace period without

Colleen Kelly, Purdue

A beauty pageant contestant in the cacao parade.



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A young singer in the cacao parade.

payment or interest while cacao matures. Interest is very low, around 1.1% or 1.2%. The interest rate is calculated according to the land size of the farm and depends on whether you are a large, medium or small-holder farmer. There are also programs that will cover large percentages of the loan, i.e. 40%. Some years the bank loans out most of its money available for these projects early, meaning there is a scarcity of money by the middle of the year. When someone takes a loan from the bank for a project, Fedecacao will provide technical assistance free of charge (funded by the 3% tax).

The well-run cacao farms we encountered had substantial capital investment – trees, drying rooftops, fermentation boxes, and other good agricultural practices. There are good credit options available for cacao farmers for inputs, renewal of trees, etc. if a farmer can figure out the paperwork. However, financing to purchase land to get into cacao is not as available.

YOUTH AND LABOR CONSTRAINTS

In order to ensure growth and long-term viability of the cacao sector, the attractiveness of cacao farming to younger generations as an appealing profession and income opportunity must be greatly enhanced. The cacao sector faces an aging rural population, youth migration to urban areas, and an array of land access issues. Cacao farms don't require a large amount of full time year-round labor, and they also don't provide large, stable incomes. The older generation is remaining on their farms and providing the primary labor and decision-making until they reach old age; we commonly saw farmers in their 60's and above. The youth we talked with who were involved in cacao, for example those employed by Fedecacao, often return home on weekends and holidays to assist their parents but their help isn't necessary full time.

Because cacao farmers are working until their 60s+, when they retire their children will be 30-40+ years old (if a parent works until 80 years old their child could easily be 60). Youth have no hope to inherit the land during their peak years, so they leave the farm in order to make a living, meaning that the farming lifestyle is skipping a generation. The younger generation we interviewed expressed frustration with respect to purchasing their own land as not a viable option in most of the departments that produce cacao in the country. By the time parents are ready to hand off the farms, the appropriate generation to take the land would be the grandchildren who have now grown up in a different lifestyle. The only successful multi-generational family farm we saw functioned because the grandfather had enough land to give each of his sons a few hectares to farm independently, but on a family compound, to support their nuclear families. However, this pattern may not hold for children who find temporary careers outside the farm, or in cases where children are unable to find jobs that pay highly enough to make living apart from their parents practical.

POST-CONFLICT ENVIRONMENT

The post-conflict environment in Colombia constitutes a challenge to rural development in general with specific implications for the cacao sector. Key issues include rural outmigration, land tenure, poor transportation infrastructure and competition with other licit and illicit crops.

The 50-year old Colombian conflict displaced 6,360,000 people. Most relocated to urban areas, particularly the larger cities such as Bogotá, Cartagena, Barranquilla, Medellin, Cali, Bucaramanga, Meta and Pasto. Most fled conflict zones suited to cacao production, or zones where cacao was already in production. USAID alternative development programs also promoted cacao as an important crop in conflict areas. These processes contributed to the lack of labor in cacao producing areas, a significant level of abandonment of cacao plantations as well as the continued aging of the producer population. In areas that are more remote, with poor road access and a lack of utilities such as electricity and potable water, land is less expensive. However, these areas are less likely to receive technical assistance while also carrying a security risk. As such, land conflict in many major cacao producing areas is an obstacle to the development of the sector.

Colleen Kelly, Purdue

Leidy Yulisa Gomez Luque from the municipality of Esmeraldas Pradera, photographed here partcipating in the cacao parade, won the beauty pageant that took place in the second San Vicente de Chucurí Cacao Festival.

RECOMMENDATIONS

Neil Palmer, CIAT

The Colombian cacao sector presents opportunities specifically in the context of post-conflict development. Cacao has the potential to be grown in areas emerging from conflict if managed using diverse farming systems by small-holder farmers. Unlike other producing countries, Colombia possesses a strong domestic market for cacao and chocolate and is home to two large confectionery companies that demand high volumes of and add value to Colombian cacao. This strong private sector provides a wide range of services (including research and education) and opportunities for public-private partnerships. On the public side, Colombia invests significant resources in the sector for technical assistance and training (through the levy of an internal tax) as well as through investments in cacao research. An institution, Fedecacao is in place to support farmers and through institutional building and technical assistance, but the breadth and depth of their reach is constrained by available resources. The public policy environment has an established entity, Consejo Nacional de Cacao, which has the potential to support collaboration and can convene among the key actors in the cacao sector or a new institution could be introduced that benefits from the lessons learned from the Consejo. Given the regional diversity of the sector, similar attention should be given to the Consejo's that are in place at the departmental level. All these factors seem to constitute good conditions for a competitive, profitable, sustainable and socially inclusive cacao sector in Colombia.

Recent efforts to promote the Colombia cacao sector have focused on expanding cacao production and to a lesser degree post-harvest management, the establishment of producer organizations and the exploration of niche markets. Despite these interventions, the sector still underperforms its potential.

Rather than focus only on cacao production, we propose a different strategy that starts by clarifying roles and responsibilities in the sector to avoid duplication and enhance coordination and collaboration amongst national and regional actors, investments in strengthening producer organizations to become viable rural businesses and the provision of clear market signals and incentives for improved practices. After considering all of the stakeholder input and available data, we feel that these interventions in combination with specific actions to improve the competitiveness and productivity of cacao production can help the cacao sector live up to its potential.

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Participants in the workshop analyzing the cacao chain, October 2016, Bogotá.

RECOMMENDATIONS TO INCREASE PRODUCTIVITY, SUSTAINABILITY, AND COMPETITIVENESS OF CACAO PRODUCTION

IMPROVE COORDINATION AND CONSISTENCY IN EXTENSION/TECHNICAL ASSISTANCE

Since agroecological zones vary considerably within Colombia, cacao production systems must address climatic, and edaphic conditions specific to each region while taking into account differences in the social, economic, and cultural circumstances that influence productivity. In order to take into account the diversity of cacao producing areas, there is a need to develop key training materials for cacao production, adapted to regional specifications. Specific gaps in existing knowledge should be systematically identified, prioritized and targeted for additional research for each cacao producing region. Regionally-tailored training materials should be incorporated into extension programs with a feedback loop that allows lessons learned in cacao production to define additional research to continuously improve best practices. Therefore, extension and technical assistance approaches should be adjusted for specific regions, promoting production systems and best practices that fit within the regional context.

Organizations providing technical assistance or extension services such as Fedecacao, producer associations, SENA, and others should be identified and brought together in order to clarify roles and avoid duplication. The oversight role might be placed with the Consejo or perhaps delegated to Fedecacao and/or Corpoica to assure technical assistance quality and regional consistency. We suggest that the training materials and learning processes be certified (undergone rigorous peer review) so as to ensure that the various organizations operating in the diverse regions are delivering consistent technical assistance services that have been confirmed to be the correct information for farmers.

Area expansion and rehabilitation continues to increase demand for extension and technical resources. Improved collaboration and sharing of resources can help to meet the needs of more cacao farmers. Extension services

Shade, provided by either timber species or plantains, helps protect young cacao trees from being scorched by the sun. Agro-forestry systems also provide producers with a more diversified source of income.

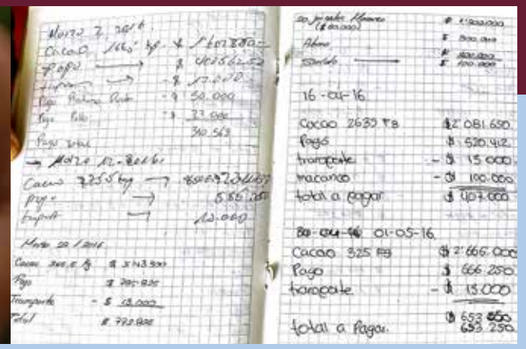
and technology transfer can also be enhanced by Peer to Peer learning including demonstration farms and farmer field schools. In order to ensure that producers become profitable, training should also highlight business skills and record keeping. Available resources for such work is currently a binding constraint and building efficiencies into the system of development and delivery of these services can contribute to a more equitable and accountable system.

TAKE INTO ACCOUNT TOTAL FACTOR PRODUCTIVITY

We recommend a systems approach where producers will manage their farms for multiple benefits. This includes planting agroforestry systems (e.g. banana or plantains) where incomes can be earned in the first years of cacao tree establishment. Total income per hectare should be adopted as a metric so as to include cacao and other relevant crops in the system. Lastly, given the differences across cacao varieties in terms of management, productivity, disease resistance, etc, more effort needs to be made towards aligning planting and grafting recommendations made by technical assistance providers with prevailing and potential future agro-economic conditions.

Photos this page: Colleen Kelly, Purdue

(Above) Farmers report the area affected by "broca," a small beetle that bores into coffee cherries, expanding as temperatures increase. Some have replaced coffee with cacao in these areas.



(Above) Transaction records, which were written in a notebook supplied by ADAM/MIDAS, illustrate income and expenses associated with a cacao enterprise (sales, loan payment, transportation costs, fertilizer, etc.).

PREPARE SECTOR FOR PRODUCTION RISKS

The stakeholders in the cacao sector should prepare to anticipate, mitigate and manage production risks. These risks include such factors as:

- **Cadmium.** Meeting the expectations of the European Union by January 1, 2019 and continuing/expanding research into cadmium-cacao issues and offering technical assistance to stakeholders on management
- **Climate shifts.** Recognizing the effects of climate shifts and anticipating new/expanding cacao production zones
- **Pest and disease pressures.** Coordinating and deploying a national strategy for cacao disease prevention and management
- **Land transitions.** Identify the constraints for marginal areas (i.e. lack of precipitation, low labor pool, non-existent technical assistance and others) to decide whether cacao is a viable crop
- **Labor constraints.** Recognize that cacao is a somewhat labor intensive cropping system and without the human power for the necessary management practices
- **Post-conflict.** Address social capital issues in post-conflict areas where farmer organizations have not been introduced, faltered or require strengthening
- **Ongoing generational shift among farmers.** Conduct an agricultural census to better understand generational dynamics taking place on the farm and offer technical assistance that build capacity for beginning farmers and assist with generational farm transition (succession planning)

PROVIDE BUSINESS DEVELOPMENT SERVICES

The workforce along the cacao supply chain needs to be developed to increase production and value added. For example, rural entrepreneurs appropriately trained and prepared could provide services for grafting, nurseries, inputs, transportation, pruning, fermentation, drying, and other areas. This presents an opportunity to increase overall rural employment and income related to the cacao sector.

DEVELOP LIVELIHOOD INDICATORS AND SET UP A MONITORING AND EVALUATION SYSTEM TO EVALUATE THE EFFECTIVENESS OF THE CACAO SECTOR

The indicators should address the sustainability of the production units, competitiveness of the producers and those that support the cacao production system, accurate measurement of productivity, and consistent cacao production data. The management of such a sector-wide information system should ideally reside with Fedecacao, with a clear commitment of public accessibility.

A cacao producer from de San Vicente de Chucurí explains how producing high-quality, well-fermented cacao is a source of personal pride, however the price premiums for quality are small, only around 200 COP/kg.

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RECOMMENDATIONS TO TRANSFORM ASSOCIATIONS INTO COMPETITIVE AND SUSTAINABLE RURAL BUSINESSES

DEFINE ROLES AND RESPONSIBILITIES OF ASSOCIATIONS

Associations need to be defined, identified, and legitimized. An accreditation process needs to be set up and a directory formed of producer organizations that the appropriate entity agrees are efficient and sustainable businesses. Institutions and organizations that have experience in farmer association development and management (e.g. Fedecacao) may be well placed to lead this initiative with input from commercial actors. We suggest that an entity (e.g. Consejo) should develop a list of criteria for accrediting associations and maintain an up-to-date and readily available directory for all stakeholders in the cacao sector. In addition, provision of follow-on organizational strengthening services needs to be offered to associations.

DEVELOP AND PROMOTE GOOD BUSINESS MODELS FOR ASSOCIATIONS

We suggest that a review of good business models from other producer associations (domestically and in nearby countries) be carried out. The business model structure should drive fidelity and consistent quality and volume for the associations and increase competitiveness in the cacao sector. The portfolio of services provided to the associations and their members should be strengthened and broadened, ensuring the inclusion of:

- Business plan development
- Savings
- Inputs
- Quality control
- Post-harvest services
- Market information
- Market access
- Credit
- Disease management
- Pruning and other good agricultural practices

Associations need to function efficiently and add value both to producer members as well as commercial partners. We suggest that the focus be placed on sustainable and profitable producer organizations as a first priority, then these associations may be able to perform Peer to Peer learning opportunities for others. We suggest that indicators for livelihoods be developed and avoid focusing just on

Participants in a supply chain analysis workshop in Bogotá look for strategies to improve the sector.

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production, and taking into consideration regional differentiation reflecting diverse production systems and cultures. Lastly, fostering organizational transparency is paramount as delivering value to stakeholders and ensuring that the necessary social capital is in place will play a significant role in sustaining these associations in the long run.

PROVIDE EXTENSION AND TECHNICAL ASSISTANCE TO ASSOCIATIONS

As with individual farmers in the above recommendation, Peer to Peer learning opportunities between producer organizations could help fill the gaps in the ability of extension and technical assistance providers to strengthen associations. These learning opportunities could cover topics such as:

- Business planning capacities
- Business skills
- Networking with cacao stakeholder organizations
- Post-harvest
- Quality control
- Transparency
- Negotiation with market actors

BUILD CREDIT WORTHINESS

Develop credit packages tailored to association needs taking into account regional variability and other pertinent factors. Financial services should focus on associations and ensure accountability to their members and likewise, hold members accountable to the associations. Solid credit worthiness could assist to bring investors into the cacao sector with a ripple effect both in the Colombian financial sector as well as in the agricultural impact investing space with organizations such as Root Capital, Fair Trade Access Fund, Incofin, etc. who are searching for additional clients for financial services.

ORGANIZE BUSINESS TO BUSINESS ROUNDTABLES

Over the medium and long term, organizing business to business roundtables with the participation of associations and other stakeholders could strengthen the success and sustainability of cacao producers' associations. As associations gain capacity, regional business to business roundtables to develop production, post-harvest management, service provision and market access strategies could prove especially useful especially if orientated around clear market demands.

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RECOMMENDATIONS TO STRENGTHEN THE SECTOR TO RESPOND TO MARKETS – CONSISTENT QUALITY AND VOLUME

FORTIFY EXTENSION/TECHNICAL ASSISTANCE SERVICES LINKING PRODUCERS TO MARKETS

Extension and technical assistance must take market access for both producers associations and smallholders into consideration. This undertaking requires monitoring of service providers and additional training and support. Production strategies should align with market demand over the short, medium and long-term. Appropriate post-harvest management practices of producers should enhance access to markets and prices and sufficient incentives should exist to drive adoption. To enhance adoption of current quality standards, it may be necessary to review price differentials between grades of cacao and how a premium is/might be transmitted and who captures them to inform the identification of effective means of incentivizing improved post-harvest practices at the farm and producer organization level.

LEVERAGE THE SAFETY NET (NATIONAL MARKET)

The existence of a strong domestic market for cacao differentiates Colombia from most other cacao producing countries. This demand constitutes an important safety net for the sale of cacao regardless of inevitable global price fluctuations. Finding ways to produce efficiently and profitably for the domestic market represents a first step towards potentially accessing higher value niche markets in the future. These niche markets remain small and will remain so for the foreseeable future. They do not currently constitute a broad solution for rural poverty but can provide incentives for improved post-harvest and organizational management for a small sub-set of growers and producer organizations that get the basics right in domestic markets. Accessing higher value markets without first producing efficiently and with consistent volumes and quality for the domestic market remains highly problematic.

SEARCH/TRANSACTION COSTS FOR MULTIPLE MARKET SEGMENTS

Crowding in more buyers for Colombian cacao may take decades. We believe that reducing search costs through up-to-date, publicly available information will significantly help develop the cacao sector in Colombia over the long-term. This might be done by identifying specific geographies as differentiated origins based on the unique interplay of genetics, environment and management, organoleptic profiles and a consistent story and share this information publicly. Industry leaders in Colombia such as Casa Luker and Nutresa as well as emerging specialty chocolate producers such as Cacao Hunters and others want good cacao and we should work with them on potential markets so they are better positioned to find and open novel markets. We should leverage their knowledge and financial muscle to position Colombian cacao on the global stage. In addition, it should be noted that the transactions costs between the farmgate and factory gate / port are real and represent opportunities for an examination into how margins are distributed along the supply chain. Efficiency gains in this context represent an opportunity to positively affect cacao producer income and ensure that all actors along the supply chain operate in a strong, competitive market.

BUILD ANALYTICAL AND RESEARCH CAPACITY

Stakeholders in the cacao sector need to better understand and leverage market trends. Institutions such as the Consejo, Fedecacao, Corpoica and local universities should be monitoring and analyzing cacao markets domestically and abroad – and developing recommendations to enhance Colombia's competitiveness in domestic and international markets.

Answering the question "who trains the trainer?" to support the cacao sector highlights the need for higher education institutions within Colombia to re-frame student preparation. Universities may impart students with scientific competence in agronomic disciplines, however becoming an effective extension professional requires specific disciplinary training in areas such as diffusion of innovation, conducting participatory research, program planning, youth development, community development, and impact analysis. The current incentive structure in universities almost exclusively prioritizes theoretical research to the detriment of more applied research, training students in these skill sets, and direct interaction with farmers.

BRAND COLOMBIAN CACAO/CERTIFICATION

Stakeholder institutions should develop incentives to increase the margin between premium and non-premium cacao, reject bad quality beans or pay significantly less for them, and incentivize good practices. We recommend reviewing current pricing models based on quality and exploring ways to create clearer market signals that favor well managed cacao as opposed to low quality beans.

The cacao sector stakeholders should evaluate the Juan Valdez model of a national brand or, alternatively, regional model based on distinct flavor profiles with regional brands. We also believe that licensing the Colombian brand could generate additional revenue. This process should include all commercial actors in the country with a unified strategy that focuses on maximizing the value and reputation of Colombian cacao on the international market. Given domestic demand, Colombia has the potential to focus export promotion on highly differentiated cacao and chocolate products. A clear focus on quality, consistency, unique value propositions and brand recognition could play a key role in maximizing income from these sales and position Colombia well. But this should not be the only strategy that is pursued since the market is extremely small and very few farmers will be able to benefit.

(Left) Nutresa and Casa Luker have committed to a goal of purchasing over 50% of their cacao directly from producer groups such as Ecocacao.
(Right) An oversized Fedecacao logo made from cacao beans.

IMPROVE THE INSTITUTIONAL ARCHITECTURE OF THE CACAO SECTOR – CLEAR RULES AND SPECIALIZATION

STRENGTHEN THE ROLE AND CREDIBILITY OF NATIONAL AND SUB-NATIONAL INSTITUTIONS IN THE CACAO SECTOR

The Consejo Nacional de Cacao has played a key role in sector governance and planning. Now is the time for the public and private sector to consider the most effective way to develop new or strengthen both the national and regional institutions concerned with governance and planning in the cacao sector. Key steps include, first, an increase in farmers and industry participation. Key organizations such as Red de Cacaoteros and representatives from smaller chocolate makers should be included to most adequately represent the diversity of the sector. Second, roles and responsibilities need to be defined with the acceptance and support of all stakeholders in the cacao sector. This includes clearly defining specific leadership roles among the institution's members for topics like research, extension, organizational strengthening, financial inclusion and market intelligence. Such clarity will allow organizations to play to their strengths and avoid duplication. Third, the institution should provide oversight and review of all projects and extension programs active in the sector to identify synergies, build common messages and provided consistent guidance and feedback to all actors. This includes coordination with international donor programs and other organizations that are offering extension and technical assistance programs operated by Casa Luker, Nutresa, Swisscontact, USAID and operators, Corpoica, SENA and others. Finally, we recommend that the institution serve as an advocacy arm of the sector, and provide oversight of the Fondo de Fomento.

At the sub-national scale, the regional institutions should be strengthened to play a similar role vis-à-vis departmental and municipal actors to ensure adequate communication and coordination across initiatives. The regional institutions should offer an important space for dialog between national level strategies and regional needs. To that end, we recommend a review of current participation in the regional councils and the construction of regionally adapted strategies for sector development in terms of research, extension, organizational strengthening, financial inclusion and market intelligence. The diversity of cacao production in Colombia requires clear national strategies that incorporate regional needs and adaptations to be effective. A well-functioning network of national and regional institutions will play a critical role in achieving this goal.

In order for the national and regional institutions to carry out their respective coordination responsibilities, we suggest an initiative to build their institutional capacity be undertaken. This would include the construction of coherent strategic plans (short, medium and long-term), and structuring the institution so that there is a representation of key actors (national / regional scales) within the organization, strengthening the coordination capabilities of all representatives and a concerted effort to place the institution at the center of the sector.

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Fedecacao employees march in a parade during the 2016 Cacao Festival in San Vicente de Chucurí.

A display at Corpoica's La Suiza research site showcases the differences between three popular cacao varieties. Note the differences in bean size.

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DEFINE A FOCUSED ROLE FOR FEDECACAO

We believe that Fedecacao needs to focus on their core business. Fedecacao should have a central role in bridging research and extension through applied research and consistent extension materials – ensuring their quality and providing continuous oversight. In addition, Fedecacao should support access to credit for farmers as part of extension services through credit preparation and presentation. Given the resource constraints faced by Fedecacao, and their need to prioritize their efforts to increase their effectiveness and impacts on the sector as whole, Fedecaco should re-examine their business plan and thoughtfully consider which investments bring the highest returns to the sector in addition to securing Fedecacao's long term sustainability. A review of funding is needed to ensure that Fedecaco can access sufficient resources to provide national coverage in these topics consistently. In addition to funding, Fedecacao should continue to build on and leverage existing alliances with key Colombian public sector actors such as SENA and universities to expand access to training, planting materials and good post-harvest processing.

IMPROVE AND LEVERAGE THE FONDO NACIONAL DE CACAO – FOMENTO

We suggest that a review be conducted to determine if the funds currently raised through the Fondo Nacional de Cacao are sufficient and are being efficiently used. This review should assess the following issues. First, is the levy currently applied to cacao bean sales sufficient to meet the development needs of the sector? Could additional funds be raised connected to value addition in terms of chocolate production? Second, are the current rules governing use of the fund for extension activities adequate and fairly applied? How can the fund better account for cacao produced in one department but sold in another?

Third, how efficient is the use of the funds in terms of achieving sector targets around improved volumes and quality of cacao? What strategies exist or can be developed to improve the efficiency of these investments? These questions need careful thought and consideration and answers to be given in order to move forward to better leverage the use of these funds.

IMPROVE THE EFFECTIVENESS OF FINAGRO IN THE CACAO SECTOR AND CROWD IN OTHER FINANCIAL SERVICE PROVIDERS

Finagro should develop regionalized credit products in line with different production systems. Credit should not just be for cacao production but for improving farming systems that are linked to livelihood indicators. This would ultimately enhance the agility in the finance sector. We also recommend that better information be provided to Finagro on production systems, profitability and time horizons for cacao production in order for credit risk to be appropriately assessed, and thereby improve risk assessment of both cacao farmers and producer organizations. This requires increased coordination between the Consejo, Fedecacao, and Finagro.

In addition to producer level credit access through Finagro, we recommend exploring opportunities for financial services to producer organizations. Globally the field of agricultural impact investing shows strong growth with a focus on providing credit to producer organizations alongside training in financial literacy and good administrative practices. Strategic support to professionalize Colombian cacao producer organizations and make them credit-worthy could potentially open opportunities for additional funding beyond that offered by Finagro at the farm level. This connects to recommendations above on producer organizations.

IMPROVE COORDINATION AMONG PUBLIC SECTOR PROGRAMS AND INTERNATIONAL DONOR PROGRAMS

Cacao can play an important role in Colombia's transition to peace given its potential in most key post-conflict areas of the country. For this to happen, however, requires improved coordination among national public policies and investments relevant for the sector. These include diverse topics ranging from funding for research to the support of programs such as Productive Alliances managed by the Ministry of Agriculture and Rural Development to training by SENA and key investments in infrastructure to reduce transport costs for producers in more distant areas. In order for cacao to provide a solid peace dividend these diverse initiatives require coordination to achieve synergies that benefit the sector.

In addition to Colombian public sector investments, the cacao sector is poised to receive significant investments under international donor programs in support of post-conflict development. Previous experiences managed principally by international implementing agencies show both successes and failures. For these programs to effectively support the Colombian cacao sector they should be aligned and coordinated both among themselves and, most importantly, with the key supply chain actors. Stand-alone programs that do not contribute to lasting capacity and institutional development will not serve the best interests of post-conflict economic development in Colombia.

As part of the institutional strengthening process delineated above, we believe that an expanded, more representative and reinvigorated national institution should take charge of coordinating national public sector and international donor support to the cacao sector. This would rightfully place the direction of international assistance in the hands of the Colombian cacao actors.

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Irrigation systems are costly to install and require access to credit. The systems, however, can not only ensure cacao tree receive adequate water, they can also be used to deliver liquid fertilizers.

This newly established plot was planted with high-yielding, fine and flavor cacao varieties and timber species and installed with a drip irrigation system (bottom left).

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BIBLIOGRAPHY

Abbott, P. (2013). Cocoa and cotton commodity chains in West Africa. In A. Elbehri (Ed.), Rebuilding West Africa's Food Potential. FAO/IFAD. Retrieved from http://www.fao.org/docrep/018/i3222e/i3222e08.pdf

Baquero Lopez, E. (Aug 2016) Personal interview.

Campfens, B., & Trepp, E. (2016, April). UTZ Cocoa Statistics Report 2015. Webinar. Retrieved from https://utz.org/better-business-hub/sourcing-sustainable-products/supply-demand-utz-coffee-cocoa-tea-develop-2015/

Cappelle, J. (2008). Towards a Sustainable Cocoa Chain | Oxfam International. Oxfam. Retrieved from https://www.oxfam.org/en/research/towards-sustainable-cocoa-chain

Comtrade. (2017). UN Comtrade | International Trade Statistics Database [Database]. Retrieved January 23, 2017, from https://comtrade.un.org/

Dand, R. (1999). The International Cocoa Trade (2nd ed.). Cambridge: Woodhead Publishing.

Dand, R. (2010). The International Cocoa Trade (3rd ed.). Cambridge: Woodhead Publishing.

Diaz, H., & Culver, K. (2014). Post-implementation evaluation of the programs More Investment in Sustainable Alternative Development (MIDAS) and Areas for Municipal-Level Alternative Development (ADAM) (Evaluation and Analysis for Learning No. AID-514-C-13-00003). Management Systems International.

FAOSTAT. (2016). FAOSTAT [Database]. Retrieved March 4, 2017, from http://www.fao.org/faostat/en/#home

Falotico, R. (2016, Aug. 30). Personal interview.

Fedecacao. (2015). Fedecacao (Production data). Fedecacao.

Fountain, A., & Hütz-Adams, F. (2015). 2015 Cocoa Barometer (USA edition). Retrieved from https://evols.library.manoa.hawaii.edu/handle/10524/48573

Homann, Frank. (2016). Fine cocoa market dynamics – bid for the future. Presented at the ICCO World Cocoa Conference, Dominican Republic.

ICCO. (2017). Fine or Flavour Cocoa. Retrieved April 23, 2017, from https://www.icco.org/about-cocoa/fine-or-flavour-cocoa.html

Iragorri Valencia, A. (2015, May). Gran Alianza Cacao - Chocolate. Bogotá, Colombia.

Last, Jesse. (2016). 2016 Transparency Report. Retrieved from https://www.tazachocolate.com/pages/2016-transparency-report

Lundy, M., Amrein, A., Hurtado, J. J., Becx, G., Zamierowski, N., Rodríguez, F., & Mosquera, E. E. (2014). LINK methodology: a participatory guide to business models that link smallholders to markets. Version 2.0. International Center for Tropical Agriculture. Retrieved from https://cgspace.cgiar.org/handle/10568/49606

Lundy, M., Gottret, M.V., Ostertag Gálvez, C. F., Best, R., & Ferris, S. (2007). Participatory market chain analysis for small-holder producers. Centro Internacional de Agricultura Tropical (CIAT). Retrieved from https://cgspace.cgiar.org/handle/10568/54198

MAGAP, 2015. Personal communication (Feb. 2017).

MADR, & Consejo Nacional Cacaotero. (2008). Plan Nacional de Desarrollo Cacaotero 2012-2021. Bogota, Colombia: Ministerio de Agricultura y Desarrollo Rural, Consejo Nacional Cacaotero. Retrieved from http://conectarural.org/sitio/sites/default/files/documentos/Plan%20Nacional%20de%20desarrolo%20cacaotero%202012-2021.pdf

Motamayor, J. C., Risterucci, A. M., Lopez, P. A., Ortiz, C. F., Moreno, A., & Lanaud, C. (2002). Cacao domestication I: the origin of the cacao cultivated by the Mayas. Heredity, 89(5), 380–386. https://doi.org/10.1038/sj.hdy.6800156

Potts, J., Lynch, M., Wilkings, A., Huppe, G. A., Cunningham, M., & Voora, V. (2014). The State of Sustainability Initiatives Review 2014: Standards and the Green Economy | IISD. Retrieved from /library/state-sustainability-initiatives-review-2014-standards-and-green-economy

Puro, G. (2016). Chocolate Candy Market in the U.S., 11th Edition. Packaged Facts. Retrieved from Market Research database.

Rios, F. (2017, February). Estudio Comparativo de Politicas Publicas de Apoyo a la Cadena de Cacao Fino y de Aroma y Experencias de Apoyo del Sector Privado.

Seguine, E. (2016, March 10). Interview with Confectionery News at the Cacao Revolution Conference, Vietanm. Retrieved from http://www.confectionerynews.com/Commodities/Everything-you-need-to-know-about-fine-flavor-coco

Stone, E. (2016, August). El Mercado "Bean-to-Bar" o "Craft" y su relevancia para Colombia. Presented at the Aromas de Paz Conference, Santander, Colombia. Retrieved from https://www.fedecacao.com.co/portal/images/Emily_Stone_-_New_York_-_Que_es_el_Bean_to_bar_y_su_aprovechamiento_para_Colombia_.pdf

TechnoServe. (2015, January). Construcción de un modelo de agricultura competitiva en Colombia: Una mirada al sector agrícola Colombiano. Retrieved from http://www.larepublica.co/sites/default/files/larepublica/Presentaci%C3%B3n%20Master%20Modelo%20Agricultura%20Competitiva%202015.pdf

UTZ. (2016). UTZ impact report 2016. UTZ. Retrieved from https://utz.org/?attachment_id=6120/

Vignati, F. (2016, May). Propuesta de valor do Proyecto: Iniciativa Latino Americana del Cacao. Presented at the ICCO World Cocoa Conference, Dominican Republic.

Wilcox, M. D., & Abbott, P. C. (2006). Can Cocoa Farmer Organizations Countervail Buyer Market Power? (2006 Annual meeting, July 23-26, Long Beach, CA No. 21261). American Agricultural Economics Association (New Name 2008: Agricultural and Applied Economics Association). Retrieved from https://ideas.repec.org/p/ags/aaea06/21261.html

Cacao...

"Source of income for the future."
"Fuente de ingreso para el futuro."

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